



Étude d'impact sur l'environnement et le milieu social
(Directive : 3214-14-062)

Lithium Guo AO :Projet Moblan Lithium
H357755

[Volume 3 - Annexes](#)

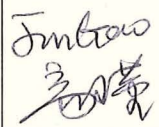
Annexe XXI

Relevés ichthyologiques (Hatch, 2019)

Report

Ichthyological surveys



			Digitally signed by Sehl, Christopher DN: cn="Christopher Sehl", o="Hatch" Date: 2019.01.21 09:08:43-0500			Digitally signed by McCulloch, Erin DN: cn="Erin McCulloch, Erin" Date: 2019.01.21 08:32:02-0500	Digitally signed by Patoine, Marie-Christine DN: cn="Marie-Christine Patoine", o="Hatch" Date: 2019.01.23 10:32:57-0500	
2019-01-18	0	Final	Signature numérique de Novotni, Jean Date: 2019.01.21 08:43:33-0500	C. Sehl and E. McCulloch	Marie-Christine Patoine	Jin Gao		
2018-09-14	A	Preliminary	Signature numérique de Novotni, Jean Date: 2019.01.21 08:43:33-0500	C. Sehl and E. McCulloch	Marie-Christine Patoine	Jin Gao		
DATE	REV.	STATUS	PREPARED BY	CHECKED BY	APPROVED BY	APPROVED BY		
HATCH					Manager	Client		

Sommaire exécutif

RELEVÉS ICHTHYOLOGIQUES

Rapports d'inventaire biologique Moblan Lithium

CONTEXTE

Les inventaires présentés dans ce rapport visaient à caractériser les habitats et les communautés de poissons que l'on retrouve dans les plans d'eau présents au site du projet Moblan Lithium afin de contribuer à l'étude d'impact sur l'environnement. Tous les relevés ichthyologiques ont été réalisés en partenariat avec EnviroCree Ltd., située dans la municipalité de Mistissini. L'intégration de professionnels de la communauté Crie est un atout en raison de leur connaissance du territoire et de l'utilisation historique des ressources halieutiques dans la région du lac Moblan.

MÉTHODOLOGIE

Dans la zone du projet, les lacs, les étangs et les cours d'eau susceptibles de soutenir le poisson et son habitat (c'est-à-dire avec un écoulement permanent et relié à des masses d'eau importantes) ont été sélectionnés pour des caractérisations complètes de l'habitat du poisson. Les études préliminaires réalisées par Golder Associates en 2011 ont contribué à effectuer notre sélection. À partir de ce critère, les lacs, les étangs et les cours d'eau suivants ont été identifiés pour les effectuer la caractérisation des communautés de poisson et de son habitat :

- Lac Moblan
- Lac Coulombe
- Étang sans nom # 1
- Étang sans nom # 2
- Cours d'eau sans nom # 5
- Cours d'eau sans nom # 6
- Cours d'eau sans nom # 7, région de Moblan
- Cours d'eau sans nom # 7, région de Coulombe

Les caractérisations ont été effectuées en suivant la méthode décrite dans le Guide de normalisation des méthodes d'inventaire ichthyologique en eaux intérieures Tome I - Acquisition de données (Service de la Faune Aquatique 2011).

RÉSULTATS ET CONCLUSIONS

Dans l'ensemble, les inventaires ont montré que les habitats situés dans les secteurs de l'étang sans nom # 2 et de l'étang sans nom # 6, incluant le cours d'eau sans nom # 5, offrent un bon potentiel pour le frai de l'omble de fontaine, ainsi que la présence de frayères et d'aires d'alimentation. Le lac Coulombe et le cours d'eau sans nom # 7 (région du lac

Coulombe) offrent également un habitat potentiel correspondant aux besoins des poissons observés. Ces zones fourniraient par ailleurs un excellent habitat d'hivernage.

Aucun omble de fontaine n'a été observé au lac Moblan, ni dans les cours d'eau qui s'écoulent dans ou hors du lac (Moblan, cours d'eau sans nom # 7, cours d'eau sans nom # 6). L'habitat de ces plans d'eau favorise plutôt les espèces de poissons-appâts qui tolèrent des eaux chaudes. Il est possible qu'à un certain moment dans le passé, les niveaux d'eau aient été suffisamment élevés pour permettre la migration de l'omble de fontaine parmi les affluents. Toutefois au moment de l'inventaire sur le terrain, le débit d'eau dans ce système était fortement réduit par rapport aux observations de la ligne des hautes eaux.

Les étangs et les cours d'eau situés à l'ouest du lac Moblan (étang sans nom # 2, cours d'eau sans nom # 5 et l'étang sans nom # 6) soutiennent diverses étapes de la vie de l'omble de fontaine, notamment pour le frai, l'alevinage et pour la quête de nourriture. En plus de l'omble de fontaine, les conditions de l'habitat seraient favorables au soutien d'autres espèces de poissons au sein de ce système hydrographique.

Bien qu'aucun inventaire ichtyologique n'ait été réalisé au lac Coulombe ou au cours d'eau sans nom# 7, les observations fortuites d'omble de fontaine et de grand brochet dans le lac indiquent vraisemblablement un niveau de qualité élevé de l'habitat dans l'ensemble du système, avec un potentiel de subsistance pour les poissons d'intérêt sportif pour les divers stades de leur vie.

Les espèces sportives les plus courantes dans la région sont le doré jaune et le grand brochet (MFFP, 2015). Le grand brochet a été observé au lac Coulombe uniquement et aucun doré n'a été pêché ni observé ailleurs. Le potentiel de ces espèces dans les autres plans d'eau de la zone d'étude est plutôt limité. Leur présence serait marginale, principalement en raison de la taille relativement modeste des étangs et donc leur faible capacité à fournir un abri et une nourriture suffisante.

Des inventaires supplémentaires devraient être envisagés pour confirmer et identifier les frayères à omble de fontaine dans le cours d'eau sans nom# 5.



Table of Contents

1. Introduction	1-1
1.1 Background	1-1
2. Ichthyological survey methodology	2-1
2.1 Study area	2-2
2.2 Weather Conditions	2-2
2.3 Selection of water bodies	2-2
2.4 Characteristics of fishing gear	2-3
2.5 Habitat characterization	2-3
2.5.1 Water quality	2-3
2.5.2 Riparian strip, flow facies and bathymetric survey	2-4
2.5.3 Aquatic plant communities and substrate	2-4
2.5.4 Fish identification	2-4
3. Survey Results	3-1
3.1 Lake Moblan	3-2
3.2 Lake Coulombe	3-4
3.3 Unnamed pond #1	3-6
3.4 Unnamed pond #2	3-7
3.5 Unnamed pond #6	3-8
3.6 Unnamed Stream #7 Lake Moblan Area	3-10
3.7 Unnamed Stream #6	3-11
3.8 Unnamed Stream #5	3-12
3.9 Unnamed Stream #7 Lake Coulombe Area	3-14
3.10 Unnamed Stream #8	3-15
3.11 Unnamed Stream #2	3-16
4. Conclusion	4-1
5. Bibliography	5-1

List of Tables

Table 1-1 : Meteorological observation	2-2
Table 2-1 : Location of waterbodies and watercourses	2-3
Table 2-2 : Characteristics of the fishing gear used	2-3
Table 3-1 : Location of fishing station	3-1
Table 3-2: Physicochemical characteristics of Lake Moblan	3-2
Table 3-3 : Fish Habitat Characterization of Moblan Lake	3-3
Table 3-4 : Physicochemical characteristics of Lake Coulombe	3-5
Table 3-5 : Characterization of fish habitat on Lake Coulombe	3-5
Table 3-6: Physicochemical characteristics of Unnamed Pond #1	3-6

Table 3-7 : Fish habitat characterization of the unnamed pond #1	3-6
Table 3-8. Physicochemical characteristics of Unnamed Pond #2.....	3-7
Table 3-9 :Fish habitat characterization of the unnamed pond #2.....	3-8
Table 3-10 : Physicochemical characteristics of Unnamed Pond #6.....	3-9
Table 3-11 : Fish habitat characterization of the unnamed pond #6	3-9
Table 3-12 : Physicochemical characteristics of Unnamed Stream #7 Lake Moblan Area	3-10
Table 3-13 : Characterization of fish habitat unnamed stream #7 (Moblan Lake area).....	3-10
Table 3-14 : Physicochemical characteristics of Unnamed Stream #6	3-11
Table 3-15 : Fish habitat characterization of the unnamed stream #6	3-11
Table 3-16 : Physicochemical characteristics of Unnamed Stream #5	3-13
Table 3-17 : Fish habitat characterization of the unnamed stream #5	3-13
Table 3-18 : Physicochemical characteristics of Unnamed Stream #7	3-14
Table 3-19 : Fish habitat characterization of the unnamed stream #7	3-14
Table 3-20 : Physicochemical characteristics of Watercourse #8	3-15
Table 3-21 : Fish habitat characterization of the unnamed stream #8	3-15
Table 3-22 : Physicochemical characteristics of Watercourse #2	3-17
Table 3-23 : Fish habitat characterization of the unnamed stream #2	3-17

List of Appendices

Appendix A	5-2
Appendix B	5-3
Appendix C	5-4
C.1 Lake Moblan	5-5
C.2 Lake Coulombe.....	5-10
C.3 Unnamed Stream #7 Lake Moblan Area	5-16
C.4 Unnamed Stream #7 Lake Coulombe Area.....	5-22
C.5 Unnamed Stream #6.....	5-28
C.6 Unnamed Stream #5.....	5-33
C.7 Unnamed Stream #8.....	5-39
C.8 Unnamed Stream #2.....	5-42
C.9 Unnamed pond #1.....	5-45
C.10 Unnamed pond #2	5-49
C.11 Unnamed pond #6	5-55

IMPORTANT NOTICE TO READER

This report was prepared by Hatch Ltd. (["Hatch"]) for the exclusive use of Guo Ao Lithium Ltd. (the ["Client"]) for the sole purpose of assisting the management of the Client to make decisions with respect to the Lake Moblan Site (the ["Site"]), and must not be used for any other purpose, or provided to, relied upon or used by any other person. Any use of or reliance upon this report by another person is done at their sole risk and Hatch does not accept any responsibility or liability in connection with that person's use or reliance.

This report contains the opinion of Hatch using its professional judgment and reasonable care based upon observations of the condition of the Site made at the time of preparation of this report, and information made available to Hatch by the Client or by certain other parties on behalf of the Client (the ["Client or Other Information"]).

The use of or reliance upon this report by the Client is subject to the following:

- (1) This report is to be read in the context of and subject to the terms of the relevant Purchase Order No. 3464-18-2330 between Hatch and the Client (the ["Agreement"]), including any methodologies, procedures, techniques, assumptions and other relevant terms or conditions specified in the Agreement.
- (2) This report is meant to be read as a whole, and sections or parts of the report must not be read or relied upon out of context.
- (3) Unless expressly stated otherwise in this report, Hatch has not verified the accuracy, completeness or validity of the Client or Other Information, makes no representation regarding the accuracy of such information and does not accept any responsibility or liability in connection with the Client or Other Information.
- (4) The condition, stability and safety of the Structure may change over time (or may have already changed) due to natural forces or human intervention, and Hatch does not accept any responsibility for the impact that such changes may have on the accuracy or validity of the opinions, conclusions and recommendations set out in this report.

Working team

Hatch Ltd.

Name	Role
Management	
Marie-Christine Patoine, ing. M.Sc.A	ESIA Manager
Elyse Hamel, ing. M.Env.	Project lead
Kathleen Vukovics, B.A.	Environmental surveys lead
Field surveys	
Jean Novotni, biol.	Aquatic surveys lead
Christopher Sehl, B.Sc.	Aquatic surveys
Erin McCulloch, B.Sc.	Aquatic surveys
Joshua Sévigny, ing jr.	Surface Water survey
Jaimee MacLeod (intern)	Aquatic surveys
Mapping	
Julianna Villeda, B.Sc.	GIS
Sladjana Pavlovic, M.Sc.	GIS

EnviroCree

Name	Role
Management	
Jim MacLeod	Logistical support
Field surveys	
Clifford MacLeod, technol.	Aquatic surveys
Alexis Deshaies, M.Sc.	Logistical support

1. Introduction

The surveys discussed in this report aimed to characterize the existing fish habitats and communities within the waterbodies surrounding the Moblan Lithium Site. All fishery surveys were carried out in partnership with EnviroCree Ltd. located in the municipality of Mistissinni. The integration of professionals from the Cree community is an asset because of their knowledge of the territory and the historic usage of fisheries resources in the Lac Moblan area.

On an anecdotal note, the use of fish is a significant element of Cree community culture. The most popular species are whitefish (*Coregonus clupeaformis*), sturgeon (*Acipenser spp.*), Walleye (*Sander vitreus*), brook trout (*Salvelinus fontinalis*), suckers (*Catostomidae Spp.*) and northern pike (*Esox Lucius*). Some parts of the fish are even used for medicinal purposes. For example, fish skin could heal an injury on an arm. (MFFP, 2015).



Photo 1 Juvenile Brook trout (*Salvelinus fontinalis*) caught in unnamed stream #5



Photo 2 Adult Pearl Dace (*Margariscus margarita*) caught in Lake Moblan

1.1 Background

Guo Ao Lithium Ltd (hereinafter referred to as the Client) is proposing to implement a concentrator plant and mine lithium (Li) ore at its Moblan Lithium site (hereinafter referred to as the Site), located approximately 100 kilometers (km) north of Chibougamau, Quebec. The Site has an area of approximately 1139 ha, as depicted in Figure 1-1. The geographic coordinates of the center of the Site is latitude 50.736289 and longitude -74.905502 and Universal Transverse Mercator (UTM) grid coordinates of 506668.416 E and 5620504.0979 N UTM NAD83 Zone18.KT

To begin construction and mining activities, the Client is required to prepare an Environmental Impact Assessment (EIA) study for the Ministry of Développement Durable,

Environnement et Lutte contre les Changements Climatiques (MDDELCC), which translates to Sustainable Development, Environment and the Fight Against Climate Change.

Hatch Ltd. has been retained by the Client to prepare this EIA report by the end of the year 2018, using a three (3) phased approach:

1. Phase 1 - Gap Analysis: to review existing background information and project data to better understand the available information and identify the missing parts. A Gap Analysis report is currently in preparation by the Hatch Engineering and Environmental services team and will be issued to Guo Ao Lithium Ltd. by June 8, 2018.
2. Phase 2 - Spring/Summer Biological Site Surveys: to gather the characteristics of the site habitat through standard biological surveys, including wetland delineation and characterization, birds, mammals, fish and reptile inventories, vegetation identification and fish habitat characterization. These surveys must be performed during a preestablished period between May and September. Previous survey reports from Golder have been consulted but only provide a high-level assessment of the site environment and must be supplemented with the proposed surveys.
3. Phase 3 - Full EIA Study: including additional site surveys if required (such as surface and underground water characterization, soil and geotechnical characterization, archeological studies). Phase 3 can be started during the late summer, with a project description to be supported by feasibility engineering, impacts assessment and mitigation planning. This work will start in July and be completed by the end of November for submission of the EIA report to the MDDELCC by the end of 2018.

The present report concerns the activities of Phase 2 □ Summer Biological Site Surveys. It contains the methodologies used for the fish habitat field surveys, the observations and a conclusion. The findings of this report will inform Phase 3 □ Full EIA Study.

2. Ichthyological survey methodology

The protocol developed for the surveys was largely based on the document: Guide de normalisation des méthodes d'inventaire ichtyologique en eaux intérieures Tome I - Acquisition de données (Service de la Faune Aquatique 2011). To facilitate the fisheries investigation, a wildlife management permit (SEG) was obtained from the Ministère de la Forêt, de la faune et des Parcs (MFFP) (#2018-07-20-155-10-G-P). The SEG is available in Appendix A.

A significant portion of the effort required to carry out the work was devoted to on-site travel. Initially, the use of an all-terrain vehicle with a trailer was planned to transport the equipment necessary for the surveys to and throughout the site. Due to the rugged terrain and steep topography that was encountered once the aquatic team arrived on site, access to study sites was greatly restricted. The use of an amphibious vehicle (ARGO) was required to safely

access the various sites. The terrain and lack of accessibility proved to be a significant limitation throughout the Ichthyological surveys and the objectives previously set for the on-site work were forced to be adjusted accordingly. Most notably, the limited ability to transport boats to the Lake Moblan and Lake Coulombe areas reduced the fishing effort that could be made on these waterbodies.

2.1 Study area

The study area is located in the bioclimatic domain of moss spruce forest in the continuous boreal forest zone. It is part of the Broadback River watershed, one of the six largest rivers in Quebec. More specifically, the site under study is located in Assinica Wildlife Reserve north of the Assinica National Park Project (MFFP, 2015). The northern portion of the site is adjacent to the Route du Nord. The map identifying the extended study area and the inventory and characterization stations shown in Figure 1-1.

2.2 Weather Conditions

Generally, the inventories were carried out during excellent weather conditions, from August 10 to 17, 2018. Table 1-1 summarizes the observations from the field work for each day. The measurements were taken using a thermometer with the accuracy of +/- 0.5 °C. Wind speed was estimated using Beaufort Scale criteria.

Table 1-1 : Meteorological observation

Date	Hour	Cloud coverage (%)	Air temperature (°C)	Precipitation (yes/no)	Wind speed (km)	Wind direction
August 10, 2018	13 h 04	0	20.7	no	5	southwest
August 11, 2018	14 h 26	100	23.9	no	5	southwest
August 12, 2018	12 h 15	90	21.6	no	10	southwest
August 13, 2018	11 h 30	10	28.9	no	5	South
August 14, 2018	11 h 45	30	22.6	no	20	South
August 15, 2018	20 h 00	100	n/a	yes	10	West
August 16, 2018	11 h 06	10	n/a	no	n/a	n/a

2.3 Selection of water bodies

Within the project area, waterbodies and watercourses having the potential to support fish and fish habitat (i.e. permanent flow and linked to significant waterbodies) were selected for comprehensive fisheries assessments. The preliminary studies carried out by Golder Associates in 2011 confirmed our selection. From this criterion, the following waterbodies and watercourses were identified for the fisheries and habitat assessments (Table 2-1).

Table 2-1 : Location of waterbodies and watercourses

Waterbody	Latitude	Longitude	UTM (18U)
Lake Moblan	50.729550	-74.897947	507202.58 E 5619755.53 N
Lake Coulombe	50.746834	-74.874621	508845.55 E 5621680.00 N
Unnamed pond #1	50.731657	-74.902461	506883.69 E 5619989.37 N
Unnamed pond #2	50.731610	-74.919042	505713.52 E 5619982.72 N
Unnamed watercourse #5	50.729663	-74.923057	505430.35 E 5619765.89 N
Unnamed watercourse #6	50.726845	-74.900420	507028.43 E 5619454.48 N
Unnamed watercourse #7 Moblan area	50.733545	-74.890720	507711.94 E 5620200.44 N
Unnamed watercourse #7 Coulombe area	50.742986	-74.880533	508429.16 E 5621251.40 N

In addition, two watercourses along the Route du Nord and one pond downstream of watercourse #5 that were not identified during the initial selection were also characterized.

2.4 Characteristics of fishing gear

Four types of fishing gear and methods were utilized during the surveys, specifications for each gear type has been provided in Table 2-2. The selection of the type of gear was made according to the characteristics of the water body to fish in the most optimal way. For example, for a watercourse or water body less than 1 m deep, a portable electric fishing was used. For water bodies deeper than 1.8 m, the experimental gill net was installed. When the depths were in the range of 1 to 1.8 m, the shoreline seine was selected.

Table 2-2 : Characteristics of the fishing gear used

Fishing gear	Type or model	Dimensions/specifications
Portable electrofisher	LR-24 - Smith-Root	Indirect current amperage less than 2.
Gill net	Experimental 10 panels	1.8 m high with 10 panels of mesh size (stretched mesh) of 38 mm, 51 mm, 64 mm, 64 mm, 76 mm, 89 mm, 102 mm, 114 mm, 127 mm, 140 mm and 152 mm
Minnow trap		Not more than 60 cm long and 25 cm wide, with the smallest funnel-shaped opening not exceeding 2.5 cm in diameter
Seine	Shoreline	Length 11 m x height 1.8 m, mesh size 6 mm

2.5 Habitat characterization

2.5.1 Water quality

A surface water quality characterization was completed in each waterbody. The main parameters were recorded for each site at different depths where possible using a multi-

parameter probe. The YSI EXO1 probe was equipped with temperature (°C), conductivity (µs/cm), dissolved oxygen (mg/L) and pH probes. Turbidity was measured using a Lamotte 2020 we model turbidimeter. Transparency measurements were made using a Secchi disk. Finally, the current velocities were measured using a SonTek Flowtraker2 current meter with the accuracy of +/- 1%.

2.5.2 Riparian strip, flow facies and bathymetric survey

Riparian strips were measured at each water quality characterization site. The measurements taken correspond to the width of the watercourse, the transverse width of the banks, the height of the bank and the depth of the water. Riparian vegetation was characterized by percentage abundance in tree, shrub, herbaceous and muscinal strata.

Stream flow patterns were described using flow types corresponding to depth, current velocity and length profile. The different facies correspond to: lentic and lotic channel, lentic, lotic and current flat, riffle, rapids, cascade and waterfall (Malavoi and Souchon, 2001). Each facies can thus be interpreted as a slope profile.

For deeper water bodies, a brief bathymetric survey was done from a boat to locate the deepest areas. The measurements were taken using a Laylin brand depth gauge, model SM-5.

2.5.3 Aquatic plant communities and substrate

Aquatic plant communities were characterized by percentage abundance in three categories: emergent, floating and submerged.

The substrate was characterized by percentage coverage according to the following granulometric classes: rock (bedrock), large boulders >500 mm, boulders 250 to 500 mm, pebble 80 to 250 mm, stone 40 to 80 mm, gravel 5 to 40 mm, sand 0.125 to 5 mm, silt 0.002 to 0.125 mm and clay <0.002 mm. In addition, the coverage of organic matter was noted by condition and color, such as containing woody debris, brown or black organic matter.

2.5.4 Fish identification

The identifications were carried out on site by experienced biologists and wildlife technicians and validated using Jean-François Desrochers and Isabelle Picard's guide Poissons d'eau douce du Québec et des Maritimes (Desrochers and Picard, 2013). The identifications were noted using the four-letter code on the field sheets. Catches were measured and weighed before being released to the survey site.

3. Survey Results

Table 3-1 illustrates each waterbody and watercourse that was included in the fisheries assessment as well as each sampling location and the fishing effort that has been achieved in the study area. The following sections detail the fish habitat and physicochemical characteristics of each waterbody as well as assess the waterbody's potential to support fish habitat.

Table 3-1 : Location of fishing station

Station	Start		End		Fishing gear
	Latitude (dd.ddddd) NAD 83	Longitude (dd.ddddd) NAD 83	Latitude (dd.ddddd) NAD 83	Longitude (dd.ddddd) NAD 83	
Lake					
Lake Moblan	50.73055	-74.89613			Minnow trap
Lake Moblan	50.73085	-74.89568			Minnow trap
Lake Moblan	50.73065	-74.89603	50.72969	-74.89626	Electrofisher
Lake Moblan	50.72967	-74.89774	50.72979	-74.89746	Gill net
Lake Coulombe	50.75429	-74.85809			Minnow trap
Lake Coulombe	50.75509	-74.85741			Minnow trap
Lake Coulombe	50.75542	-74.85781			Minnow trap
Lake Coulombe	50.74928	-74.87270			Observation
Pond					
Unnamed pond #1	50.73157	-74.90205	50.73199	-74.90163	Gill net
Unnamed pond #2	50.73087	-74.92100			Minnow trap
Unnamed pond #2	50.73178	-74.91969			Minnow trap
Unnamed pond #2	50.73125	-74.92052	50.73093	-74.92120	Electrofisher
Unnamed pond #2	50.73092	-74.92100			Shoreline seine
Unnamed pond #6	50.72626	-74.92632			Not fished
Water course					
Unnamed Stream #7 Lake Moblan Area	50.73605	-74.88699	50.73219	-74.89355	Electrofisher
Unnamed Stream #7 Lake Moblan Area	50.73477	-74.88849			Not fished
Unnamed Stream #6	50.72680	-74.90047	50.72770	-74.90043	Electrofisher
Unnamed Stream #5	50.73038	-74.92153	50.73061	-74.92124	Electrofisher
Unnamed Stream #5	50.73061	-74.92124			Minnow trap
Unnamed Stream #5	50.72653	-74.92573			Observation

Station	Start		End		Fishing gear
	Latitude (dd.ddddd) NAD 83	Longitude (dd.ddddd) NAD 83	Latitude (dd.ddddd) NAD 83	Longitude (dd.ddddd) NAD 83	
Unnamed Stream #7 Lake Coulombe Area	50.74337	-74.87957			Observation
Unnamed Stream #8	50.74633	-74.91403			Not fished
Unnamed Stream #2	50.74811	-74.90764			Not fished

3.1 Lake Moblan

Lake Moblan is located at an altitude of 477 metres. The lake is drained by the unnamed stream #5, which flows to Lake Chaloneau and then to Lake Frotet. Two tributaries have been identified, unnamed stream #7 (Moblan sector) and a low-flow tributary located in the northwestern part of the lake. An aerial view of the water body is presented in Appendix A.

The physicochemical characteristics of the water in Lake Moblan (Table 3-2) do not offer suitable habitat for many fish species. Pearl Dace (*Margariscus margarita*) were captured in Lake Moblan via electrofishing. They were captured in an area of the lake characterized by shallow water, pebbles and no aquatic vegetation. Pearl Dace spawn in spring in relatively warm (18°C) and shallow (55 cm) water on a substrate composed of sand and gravel (SCOTT and CROSSMAN, 1974).

Based on the physicochemical characteristics of Lake Moblan, it is likely that the waterbody does not have the potential to support cool or cold-water sportfish species. The shallow depth promotes an increase in water temperature during the summer months.

Table 3-2: Physicochemical characteristics of Lake Moblan

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	pH	Total phosphorus µg/L ^a	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Lake Moblan	11 August 2018	12 h 49	20.3	8.81	6.93		21.09	1.2	n.d.	0.1
Lake Moblan	11 August 2018	12 h 15	21.1	9.06	7.11		20.26	n/a	n.d.	0.5
Lake Moblan	14 August 2018	20 h 00	21.3	7.90	7.16	9.7 [†]	19.72	0.9	3.0	0.2

[†]Average triplicate value, for lakes and ponds two sites combined. Reported detection limit of 2.0 µg/L (Rapport d'échantillonnage des eaux de surface et des sédiments)

[‡] Sampling conducted on August 15, 2018

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	pH	Total phosphorus µg/L	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Lake Moblan	14 August 2018	20 h 00	21.6	4.21	7.03		16.79	0.9	3.0	4.1

Table 3-3 : Fish Habitat Characterization of Moblan Lake

Date(s):	August 11 and 14, 2018	Area/length:	4.7 ha
Substrate:	Organic, Pebble, Stone	Substrate condition:	Aggradation and deposition
Aquatic plant communities:	< 5 %	Dominant category:	Algae, emerging
Riparian vegetation:	Shrubs 100 %, Tree cover 95 %, grasses 10 %	Dominance:	Ericaceous, conifers, grasses and sedges
Facies:	Lentic	Flow velocity:	None
Transverse profile:	<input type="checkbox"/>	Depth:	4.1 m (maximum)
Fishing gear used:	Effort/duration: Electrofisher: 442 sec Minnow trap: 28 h 10 Minnow trap: 28 h 10 Gill net: 15 h 30	Remarks: The Pearl Dace were captured in the same place. Unidentified fish were observed in the northeastern part near unnamed stream #7. An unmaintained beaver dam is located at the southwest end of the lake. Several leeches observed. In the deep areas of the lake, the substrate is composed of a thick layer of organic matter.	
Electrofisher	Pearl Dace (Mulet perlé, <i>Margariscus margarita</i>)		
Minnow trap	Nothing		
Gill net	Nothing		
Shore Seine	Not used	Spawning potential:	Pearl Dace
Catch(s):	Pearl Dace	N=17	Adult

3.2 Lake Coulombe

Lake Coulombe is located at an altitude of 432 meters. The lake is drained by the stream located in its northeastern part and flows towards Lake Lezai. Lake Coulombe has many small tributaries, one has been identified, the unnamed stream #7 (Coulombe sector). An aerial view of the water body is presented in Appendix A.

The physicochemical characteristics of the water in Lac Coulombe offer suitable fish habitat for a variety of species. Both adult brook trout and northern pike were observed from the boat near the northwest area of the lake. The habitat where each species has been observed is characterized by a shallow depth with some shelters. Temperature values at different depths show a summer stratification of the lake. The low level of dissolved oxygen measured is characteristic of a eutrophic lake. We therefore observe adequate conditions in the first 5 meters for the species observed.

Northern pike spawn in spring in relatively cold water (4 to 11°C) on floodplains with dense vegetation (SCOTT and CROSSMAN, 1974). Brook trout spawn in the fall in gravel nests that the female digs, generally at a depth of 60 cm in oxygenated waters (SCOTT and CROSSMAN, 1974).

As both brook trout and northern pike were observed during the field study, it is likely that Lac Coulombe offers suitable habitat for many species of fish to carry out different life processes including spawning, rearing, overwintering and foraging habitats.

Table 3-4 : Physicochemical characteristics of Lake Coulombe

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	Total phosphorus µg/L ⁺⁺	pH	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Lake Coulombe	16 August 2018	13 h 00	16.1	8.24		6.48	19.12	1.5	2.5	2.8
Lake Coulombe	16 August 2018	13 h 00	16.0	7.67		6.17	18.55	n/a	n/a	4.8
Lake Coulombe	16 August 2018	13 h 00	15.8	2.65	7.2	5.88	12.90	n/a	n/a	6.8
Lake Coulombe	16 August 2018	13 h 00	16.5	1.70		6.05	11.40	n/a	n/a	8.8

Table 3-5 : Characterization of fish habitat on Lake Coulombe

Date(s):	August 15 and 16, 2018	Area/length:	43.4 ha
Substrate:	Sand, Boulders Organic	Substrate condition:	Clean
Aquatic plant communities:	None identified	Dominant category:	<input type="checkbox"/>
Riparian vegetation:	Shrubs 80 %, Tree cover 5 %, Grasses 5 %	Dominance:	Ericaceous, conifers, grasses and sedges
Facies:	Lentic	Flow velocity:	None
Transverse profile:	<input type="checkbox"/>	Depth:	9.3 m (maximum)
Fishing gear used:	Effort/duration: Minnow trap: 14 h 45 Minnow trap: 14 h 45 Minnow trap: 14 h 45	Remarks: A failure of the boat's motor did not allow the fishing gear to be installed. Observations made within the shallow northwest portion of the lake identified both Northern pike and Brook trout. In the deep areas of the lake, the substrate is composed of a thick layer of organic matter.	
Electrofisher	Not used		
Minnow trap	Nothing		
Gill net	Not used		

Average triplicate value, for lakes and ponds two sites combined. Reported detection limit of 2.0 µg/L (Rapport d'échantillonnage des eaux de surface et des sédiments)

Shore Seine	Not used	Spawning potential:	Pearl Dace, Brook Trout and Northern Pike
Catch(s):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.3 Unnamed pond #1

Unnamed pond #1 is located at an altitude of 502 meters. The pond is drained by the stream located in its northern part and flows towards Lake Lezai. An aerial view of the water body is presented in Appendix A.

The physicochemical characteristics of the water in Unnamed Pond #1 do not offer suitable fish habitat. At the time of the field investigation, water levels were severely reduced from the highwater level.

Table 3-6: Physicochemical characteristics of Unnamed Pond #1

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	Total phosphorus µg/L [§]	pH	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Unnamed pond #1	10 August 2018	17 h 28	7.8	7.77	8.8	5.56	18.24	n.d.	1.8	0.7
Unnamed pond #1	10 August 2018	17 h 28	10.3	0.80		5.63	11.93	n.d.	1.8	2.2

Table 3-7 : Fish habitat characterization of the unnamed pond #1

Date(s):	August 10 and 11, 2018	Area/length:	1.4 ha
Substrate:	Organic	Substrate condition:	Clogged
Aquatic plant communities:	5 %	Dominant category:	Floating
Riparian vegetation:	Tree cover 30 % Shrubs 10 % Grasses 30 %	Dominance:	Conifers, Grasses and Carex, Ericaceous
Facies:	Lentic	Flow velocity:	None
Transverse profile:	<input type="checkbox"/>	Depth:	4.2 m (maximum)

[§] Average triplicate value, for lakes and ponds two sites combined. Reported detection limit of 2.0 µg/L (Rapport d'échantillonnage des eaux de surface et des sédiments)

Fishing gear used:	Effort/duration: Gill net: 24 h 45	Remarks: The substrate of the entire pond is composed of a thick layer of organic matter. There is a narrow band of boulders in the south bank.	
Electrofisher	Not used		
Minnow trap	Not used		
Gill net	Nothing		
Shore Seine	Not used	Spawning potential:	None
Catch(s):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.4 Unnamed pond #2

Unnamed pond #2 is located at an altitude of 468 meters. The pond is drained by Unnamed Stream #5 located in its southwestern area and flows to unnamed pond #6, then to Tortigny Lake. An aerial view of the water body is presented in Appendix A.

The physico-chemical characteristics of the water in Unnamed Pond 2 (Table 3-8) demonstrate acceptable fish habitat. Adult brook trout were captured in a deep pool in the west end of the pond. This area is characterized by bedrock and boulder substrates covered in a dense layer of organic materials. The pond does not offer spawning potential for brook trout. Brook trout spawn in the fall in gravel nests that the female digs, generally at a depth of 60 cm in cold, oxygenated waters (SCOTT and CROSSMAN, 1974).

At the time of the field investigation, the water level of the pond was very low compared to the high-water mark. Many small tributaries and defined channels surrounding the pond were dried up.

Table 3-8. Physicochemical characteristics of Unnamed Pond #2

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	pH	Total phosphorus µg/L**	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Unnamed pond #2	12 August 2018	8 h 25	4.7	8.81	6.72	16.0††	18.50	1.1	n/a	0.5

** Average triplicate value, for lakes and ponds two sites combined. Reported detection limit of 2.0 µg/L (Rapport d'échantillonnage des eaux de surface et des sédiments)

†† Sampling conducted on August 16, 2018

Table 3-9 :Fish habitat characterization of the unnamed pond #2

Date(s):	August 12, 13 and 14, 2018	Area/length:	1.8 ha
Substrate:	Organic, Gravel, Block	Substrate condition:	Clogged
Aquatic plant communities:	15 %	Dominant category:	Emerging, Floating
Riparian vegetation:	Tree cover <5 % Shrub 20 % Grass 80 %	Dominance:	Grasses and sedges, Ericaceous, Conifers
Facies:	Lentic	Flow velocity:	None
Transverse profile:	□	Depth:	n.a.
Fishing gear used:	Effort/duration: Minnow trap : 24 h 41 Electricofisher: 439 sec Shore Seine: 220 m ²	Remarks: The substrate of the entire pond is composed of a thick layer of organic matter. Catches were made in the same area of the pond, the deep part located in the southwest section. An unmaintained beaver dam is located at the southwest end of the pond.	
Electricofisher	Nothing		
Minnow trap	Brook trout		
Gill net	Not used		
Shore Seine	Brook trout	Spawning potential:	Low
Catch(s):	Brook trout	N=7	Adult

3.5 Unnamed pond #6

Unnamed pond #6 is located at an altitude of 444 meters. The pond is drained by a stream located in its southern part and flows towards Lake Tortigny. An aerial view of the water body is presented in Appendix A.

The physico-chemical characteristics of the water in Unnamed Pond 6 (Table 3-10) demonstrate potential fish habitat for a variety of species. Many juvenile brook trout (+100) were observed at a tributary, Unnamed Stream #5, flowing into the pond along the east shore from Unnamed Pond 2. This area was characterized by gravel and sand substrates, cool, very clear water. It is likely brook trout reside in the pond and migrate up this stream to spawn. In addition to supporting brook trout, the pond offers potential northern pike spawning habitat based on the emergent grasses throughout the pond.

Table 3-10 : Physicochemical characteristics of Unnamed Pond #6

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	pH	Total phosphorus µg/L [#]	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Unnamed pond #6	13 August 2018	15 h 00	17.3	8.31	8.18	n.a.	24.12	1.5	n/a	0.1

Table 3-11 : Fish habitat characterization of the unnamed pond #6

Date(s):	August 13, 2018	Area/length:	3.4 ha
Substrate:	Boulders, Big boulders, Sand	Substrate condition:	Deposition
Aquatic plant communities:	20 %	Dominant category:	Floating, emergent
Riparian vegetation:	Tree cover 5 % Shrub 60 % Grass 20 %	Dominance:	Ericaceous, Grasses and sedges, Conifers
Facies:	Lentic	Flow velocity:	None
Transverse profile:	<input type="checkbox"/>	Depth:	n.a.
Fishing gear used:	Effort/duration: n.a.	Remarks: Fishing investigations were not conducted at unnamed pond #6	
Electricfisher	n.a.		
Minnow trap	n.a.		
Gill net	n.a.		
Shore Seine	n.a.	Spawning potential:	Not evaluated
Catch(s):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[#] Average triplicate value, for lakes and ponds two sites combined. Reported detection limit of 2.0 µg/L (Rapport d'échantillonnage des eaux de surface et des sédiments)

3.6 Unnamed Stream #7 Lake Moblan Area

Unnamed stream #7 in the Moblan Lake area is located at an altitude of 489.8 to 477 meters. The watercourse is a tributary of Lake Moblan, which flows from the east and offers permanent flow into the lake. An aerial view of the water body is presented in Appendix A.

The physicochemical characteristics of the unnamed stream #7 (Table 3-12) offer suitable fish habitat. Throughout the watercourse, cover for fish species is provided by an abundance of overhanging vegetation, some undercut banks and in-stream woody debris. The substrates within the stream consist of sand covered in a layer of organic material. The stream is divided into several small channels, some of which are intermittent. Although no fish were captured at this site, given the downstream connection to Lake Moblan, it is likely that pearl dace are present in this watercourse during periods of higher water levels.

Table 3-12 : Physicochemical characteristics of Unnamed Stream #7 Lake Moblan Area

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	pH	Total phosphorus µg/L ^{§§}	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Unnamed Stream #7 Lake Moblan Area	10 August 2018	13 h 04	22.6	8.79	6.56	17.3	12.38	n.d.	n/a	0.1

Table 3-13 : Characterization of fish habitat unnamed stream #7 (Moblan Lake area)

Date(s):	August 10, 2018	Area/length:	254 m
Substrate:	Sand, Organic	Substrate condition:	Deposition
Aquatic plant communities:	20 %	Dominant category:	Algae
Riparian vegetation:	Tree cover 10 % Shrub 90 % Grass 5 %	Dominance:	Ericaceous and betulaceous, Conifers, Grasses
Facies:	Lotic flat	Flow velocity:	0.002 m/sec
Transverse profile:	Chanel width: 1.1 m Shore width: 1.65 m Shore height: 0.5 m	Depth:	5 cm (average)

^{§§} Average triplicate value, for lakes and ponds two sites combined. Reported detection limit of 2.0 µg/L (Rapport d'échantillonnage des eaux de surface et des sédiments)

Fishing gear used:	Effort/duration: Electrofisher: 551 sec	Remarks: The facies of the watercourse were characterized as lentic flat.	
Electricofisher	Nothing		
Minnow trap	Not used		
Gill net	Not used		
Shore Seine	Not used	Spawning potential:	Pearl Dace
Catch(s):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.7 Unnamed Stream #6

Unnamed stream #6 is located at an altitude of 477 to 410 meters. It is a permanent watercourse flowing south from Lac Moblan into Lac Chalonneau. An aerial view of the water body is presented in Appendix A.

The physicochemical characteristics of the unnamed stream #6 offer suitable fish habitat for baitfish species. Pearl dace was captured in the watercourse via electrofishing near the Lake Moblan outlet. The shallow watercourse was characterized by boulders, pebble and stone substrates throughout with deeper pools further downstream. Due to very low water levels in Lac Moblan, very little flow was observed entering the watercourse. Pearl Dace spawn in spring in relatively warm (18°C) and shallow (55 cm) water on a substrate composed of sand and gravel (SCOTT and CROSSMAN, 1974).

Table 3-14 : Physicochemical characteristics of Unnamed Stream #6

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	pH	Total phosphorus µg/L ^{***}	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Unnamed Stream #6	11 August 2018	14 h 26	22.3	8.21	6.72	n.a.	19.05	1.0	n/a	0.1

Table 3-15 : Fish habitat characterization of the unnamed stream #6

Date(s):	August 11, 2018	Area/length:	1793.68 m
Substrate:	Pebble, Stone, Boulders	Substrate condition:	Deposition

*** Average triplicate value, for lakes and ponds two sites combined. Reported detection limit of 2.0 µg/L (Rapport d'échantillonnage des eaux de surface et des sédiments)

Aquatic plant communities:	< 5 %	Dominant category:	Floating
Riparian vegetation:	Tree cover 10 % Shrub 80 % Grass 5 %	Dominance:	Mericaceae, Ericaceae, Conifers, Grasses
Facies:	Lentic, Lentic flat and rapid	Flow velocity:	Slow
Transverse profile:	Chanel width: 2.9 m Shore width: 4.95 m Shore height: 0.75 m	Depth:	15 cm (average)
Fishing gear used:	Effort/duration: Electricofisher: 550 sec	Remarks: In the upstream part of the stream (Moblan Lake outlet) there is an abandoned beaver dam.	
Electrofisher	Pearl Dace		
Minnow trap	Not used		
Gill net	Not used		
Shore Seine	Not used	Spawning potential:	Pearl Dace and Brook trout
Catch(s):	Pearl Dace	N=1	Adult

3.8 Unnamed Stream #5

Unnamed stream #5 is located at an altitude of 468 to 444 meters. It takes its source from pond #2. The flow is towards the unnamed pond #6 and then Tortigny Lake and offers a permanent flow. The physicochemical characteristics of the unnamed stream #5 are good for fish habitat. An aerial view of the water body is presented in Appendix A.

Brook trout were captured in the watercourse immediately downstream of Pond #2 via minnow trapping and electrofishing. The habitat surrounding the fish capture location is characterized by gravel and sand substrates with clear water, in-stream cover offered from woody debris.

Juvenile brook trout, about 200 individuals, were observed in the downstream section of the stream where it flows into Unnamed pond #6 (see Section 3.5). Brook trout spawn in the fall in gravel nests that the female digs, generally at a depth of 60 cm in oxygenated waters (SCOTT and CROSSMAN, 1974).

Table 3-16 : Physicochemical characteristics of Unnamed Stream #5

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	pH	Total phosphorus µg/L [±]	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurement s (m)
Unnamed Stream #5	13 August 2018	11 h 30	15.2	6.97	6.78	n.a.	21.78	3.5	n/a	0.1

Table 3-17 : Fish habitat characterization of the unnamed stream #5

Date(s):	August 13 and 14, 2018	Area/length:	648.31 m
Substrate:	Gravel, sand, block	Substrate condition:	Deposition
Aquatic plant communities:	20 %	Dominant category:	Emerging, floating and submerged
Riparian vegetation:	Tree cover 70 % Shrub 30 % Grass 100 %	Dominance:	Conifers, Grasses and sedges, Ericaceous
Facies:	Lotic flat, Lentic flat and rapid	Flow velocity:	0.065 m/sec
Transverse profile:	Chanel width: 1.25 m Shore width: 1.93 m Shore height: 0.5 m	Depth:	30 cm (average)
Fishing gear used:	Effort/duration: Minnow trap: 19 h 15 Electricfisher: n.a.	Remarks: The watercourse has a suitable spawning habitat for brook trout.	
Electrofisher	Brook trout		
Minnow trap	Brook trout		
Gill net	Not used		
Shore Seine	Not used	Spawning potential:	Brook trout
Catch(s):	Brook trout	N=3	Two juveniles and one adult

± Average triplicate value, for lakes and ponds two sites combined. Reported detection limit of 2.0 µg/L (Rapport d'échantillonnage des eaux de surface et des sédiments)

3.9 Unnamed Stream #7 Lake Coulombe Area

Unnamed stream #7 is located at an altitude of 489.8 to 432 meters. The watercourse exhibits permanent flow and flows northeast into Lac Coulombe. An aerial view of the water body is presented in Appendix A.

The physicochemical characteristics of the unnamed stream #7 (Table X) offer suitable fish habitat. The water temperature and dissolved oxygen values observed at the site provide favorable conditions for cold-water species. The outlet of the unnamed stream #7 is mainly covered with grasses, the high-water mark indicates that this section of the stream is submerged during the spring period and provides ideal conditions for northern pike spawning. Three northern pike were observed at the outlet of the watercourse. Northern pike spawn in spring in relatively cold water (4 to 11°C) on floodplains with dense vegetation (SCOTT and CROSSMAN, 1974).

Table 3-18 : Physicochemical characteristics of Unnamed Stream #7

Station	Date	Hour	Conductivity $\mu\text{S/cm}$	Dissolved oxygen (mg/L)	pH	Total phosphorus $\mu\text{g/L}\ddagger$	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Unnamed Stream #7 Lake Coulombe Area	16 August 2018	11 h 06	28.2	9.73	6.64	17.3	9.73	1.9	n/a	0.1

Table 3-19 : Fish habitat characterization of the unnamed stream #7

Date(s):	August 16, 2018	Area/length:	1541.14 m
Substrate:	Boulder, sand, gravel	Substrate condition:	Clean
Aquatic plant communities:	Absent	Dominant category:	<input type="checkbox"/>
Riparian vegetation:	Tree cover 20 % Shrub 35 % Grass 60 %	Dominance:	Grasses and sedges, Betulaceous and Salicaceous, Conifers
Facies:	Lentic flat	Flow velocity:	0.029 m/sec
Transverse profile:	Chanel width: 1.78 m Shore width: 2.24 m Shore height: 0.55 m	Depth:	38 cm (average)

^{†††} Average triplicate value, for lakes and ponds two sites combined. Reported detection limit of 2.0 $\mu\text{g/L}$ (Rapport d'échantillonnage des eaux de surface et des sédiments)

Fishing gear used:	Effort/duration: <input type="checkbox"/>	Remarks: The unnamed stream #7 Coulombe Lake area was not fished. Three Adults Northern pike were observed at the outlet of the stream at Lac Coulombe	
Electricfisher	Not used		
Minnow trap	Not used		
Gill net	Not used		
Shore Seine	Not used	Spawning potential:	Northern pike, Brook trout
Catch(s):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.10 Unnamed Stream #8

The unnamed stream #8 is located at an altitude of 485 to 379 meters. The flow is towards Lake Lezai and offers a permanent flow. An aerial view of the water body is presented in Appendix A.

The physicochemical characteristics of the watercourse (Table X) offer ideal habitat for brook trout and other cold-water species. The stream was characterized by sand and gravel substrates with a high dissolved oxygen content and cold-water temperature. There was very little sediment or organic materials covering the substrates. The cold water of this stream suggests that it could be supplied from underground sources.

Table 3-20 : Physicochemical characteristics of Watercourse #8

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	pH	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurements (m)
Unnamed Stream #8	14 August 2018	15 h 15	22.6	10.85	7.16	7.63	0.7	n/a	0.1

Table 3-21 : Fish habitat characterization of the unnamed stream #8

Date(s):	August 14, 2018	Area/length:	2037.07 m
Substrate:	Sand, gravel	Substrate condition:	Clean
Aquatic plant communities:	0 %	Dominant category:	<input type="checkbox"/>

Riparian vegetation:	Tree cover 15 % Shrub 80 % Grass < 5 %	Dominance:	Betulaceae and salicaceae, Conifers, Grasses and sedges
Facies:	Lotic flat	Flow velocity:	0.16 m/sec
Transverse profile:	Chanel width: 1.69 m Shore width: 2.29 m Shore height: 0.3 m	Depth:	10 cm (average)
Fishing gear used:	Effort/duration: <input type="checkbox"/>	Remarks: The unnamed stream #8 was not fished.	
Electrofisher	Not used		
Minnow trap	Not used		
Gill net	Not used		
Shore Seine	Not used	Spawning potential:	High <input type="checkbox"/> Brook trout, other cold-water species
Catch(s):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3.11 Unnamed Stream #2

The unnamed stream #2 is located at an altitude of 502 to 354 meters. The watercourse originates from Unnamed Pond #1 and flows north into Lac Lezai, exhibiting an intermittent flow. An aerial view of the water body is presented in Appendix A.

The physicochemical characteristics of the watercourse (Table 3-23) do not offer suitable fish habitat. The watercourse exhibits some turbidity and conductivity with a low dissolved oxygen content. The substrate consists of a dense layer of organic materials and the watercourse lacks aquatic vegetation.

Table 3-22 : Physicochemical characteristics of Watercourse #2

Station	Date	Hour	Conductivity µS/cm	Dissolved oxygen (mg/L)	pH	Temperature (°C)	Turbidity (NTU)	Secchi (m)	Depth of measurement s (m)
Unnamed Stream #2	14 August 2018	14 h 40	52.7	5.36	6.45	17.07	2.4	n/a	0.1

Table 3-23 : Fish habitat characterization of the unnamed stream #2

Date(s):	August 14, 2018	Area/length:	3215.99 m
Substrate:	Organic	Substrate condition:	Clogged
Aquatic plant communities:	0 %	Dominant category:	<input type="checkbox"/>
Riparian vegetation:	Tree cover < 5 % Shrub 40 % Grass 60 %	Dominance:	Grasses and sedges, Betulaceous and Salicaceous, Conifers
Facies:	Lentic flat	Flow velocity:	None
Transverse profile:	Chanel width: 1.0 m Shore width: 1.05 m Shore height: 0.4 m	Depth:	26 cm (average)
Fishing gear used:	Effort/duration: <input type="checkbox"/>	Remarks: The unnamed stream #2 was not fished.	
Electrofisher	Not used		
Minnow trap	Not used		
Gill net	Not used		
Shore Seine	Not used	Spawning potential:	None
Catch(s):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Conclusion

Overall, the inventories illustrated that the habitats located in the unnamed pond #2 and unnamed pond #6 sectors, including unnamed stream #5, offer good potential for brook trout spawning, as well as the presence of hatchery and feeding areas. Coulombe Lake and unnamed stream #7 (Coulombe Lake area) also provide habitat that may offer good potential to meet the needs of observed fish. These areas would provide excellent wintering habitat.

No brook trout were observed at Lac Moblan or the watercourses that flow into or out of the lake (Moblan, Watercourse 7, Watercourse 6). Habitat at these waterbodies is supportive of warm water baitfish species. There is potential that at one point in time, water levels were high enough to allow for the migration of brook trout among the tributaries but at the time of the field investigation, the water flow within this system was very reduced from its high-water mark.

The ponds and watercourses west of Lake Moblan (Pond 2, Watercourse 5, Unnamed Pond 6) support various life stages of brook trout, including spawning, rearing and foraging functions. In addition to brook trout, habitat conditions are favourable to support other fish species within this system.

While no fisheries inventories were conducted at Lake Coulombe or Watercourse #7 Coulombe, the incidental observations of both brook trout and northern pike in the lake indicate the high-quality fish habitat that is likely present throughout this system, with the potential to support various life stages of sportfish species.

The most common sports species in the region are Walleye and Northern pike (MFFP, 2015). Northern pike were only observed at Lac Coulombe and no Walleye were seen or fished elsewhere. Limited potential exists for these species in the other waterbodies within the study area. However, their presence would be marginal, mainly due to the relatively small size ponds and their ability to provide adequate shelter and food.

Additional inventories should be considered to confirm and identify brook trout spawning grounds in unnamed stream #5.

5. Bibliography

SERVICE DE LA FAUNE AQUATIQUE, 2011. Guide de normalisation des méthodes d'inventaire ichtyologique en eaux intérieures, Tome I, Acquisition de données, ministère des Ressources naturelles et de la Faune, Québec, 137 p.

MINISTÈRE DES FORÊTS, DE LA FAUNE, ET DES PARCS (MFFP), 2015. État des connaissances. Projet de parc national Assinica. La culture enou grandeur nature. Direction des parcs nationaux. En ligne. <https://mffp.gouv.qc.ca/parcs/reseau-parcs-nationaux/documents/projet-parc-Assinica.pdf>

GOLDER ASSOCIATES LTD (GOLDER), 2011. Moblan Lithium Project □ Aquatics field investigation summary (October 2011). Technical Memorandum TM-DOC0022-Rev.A. 12 p.

MALAVOI, J.R. ET Y. SOUCHON, 2001. Description standardisée des principaux faciès d'écoulement observable en rivière : clé de détermination qualitative et mesures physique. Bulletin Fr. Pêche Pisciculture (2001) 365-366 : 375-372.

BOUDREAULT, A., 1984. Méthode d'évaluation des habitats à saumon par photo-interprétation, rapport de Gilles Shoener inc. Pour le ministère du Loisir, de la Chasse et de la Pêche, 24p.

SCOTT, W.B. et E.J. CROSSMAN, 1974. Poissons d'eau douce du Canada, Bulletin 184, Office des recherches sur les pêcheries du Canada, 1026p.



Guo Ao Lithium Ltd.
Biological Surveys of Moblan Lithium Project
H357755

Project Management Report
Environment Sustainability and Community Interface
Management
Aquatic Surveys of Moblan Lithium Project

Appendix A

Wildlife Management Permit (SEG)

Appendix B

Aerial view of the waterbodies and fishing gear used



Guo Ao Lithium Ltd.
Biological Surveys of Moblan Lithium Project
H357755

Project Management Report
Environment Sustainability and Community Interface
Management
Aquatic Surveys of Moblan Lithium Project

Appendix C

Photographs of the surveys sites

The photos were taken during the inventories that took place from August 9 to 17, 2018. In general, the photos are taken from the survey stations. A series of six photographs per station show the upstream and downstream sections and the right and the left banks of the watercourses. For water bodies, the orientation is indicated using cardinal points. In addition, photographs show an overview of the canopy and substrate. For the photos, an aerial view, see inset, of the water body indicates the direction of the point of view with an arrow. To locate the water body in the study area, refer to general map see figure 1-1.

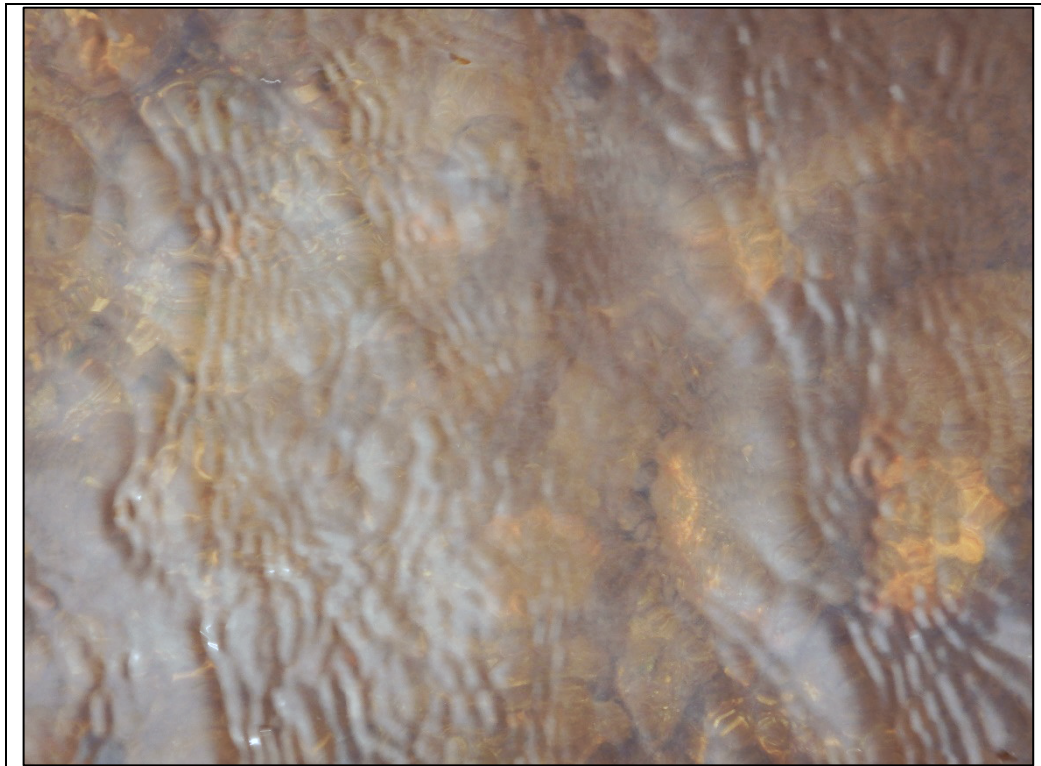
C.1 Lake Moblan





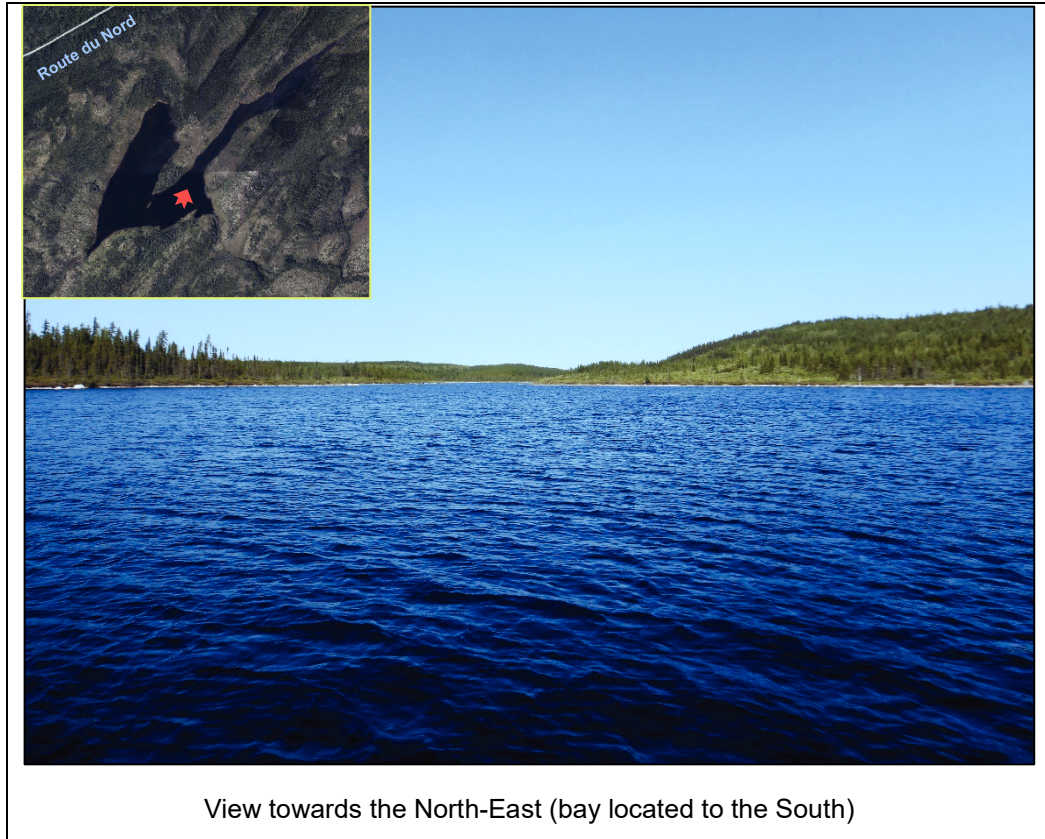






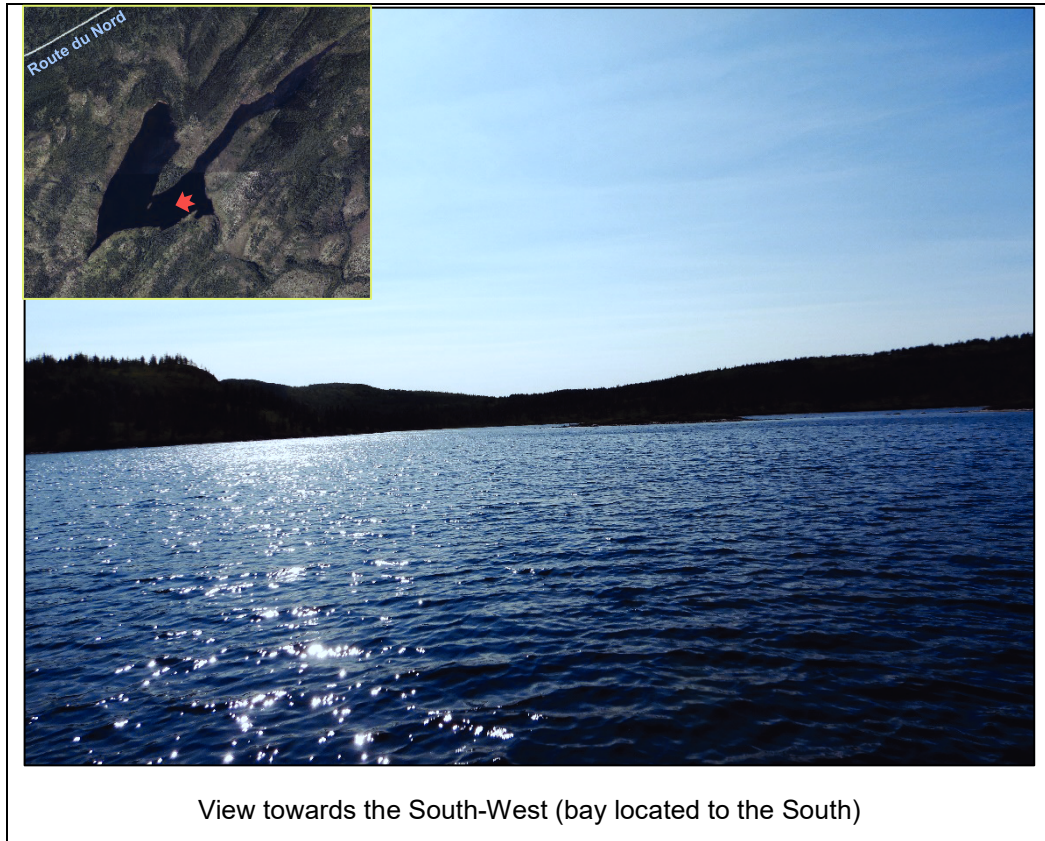
View of the substrate

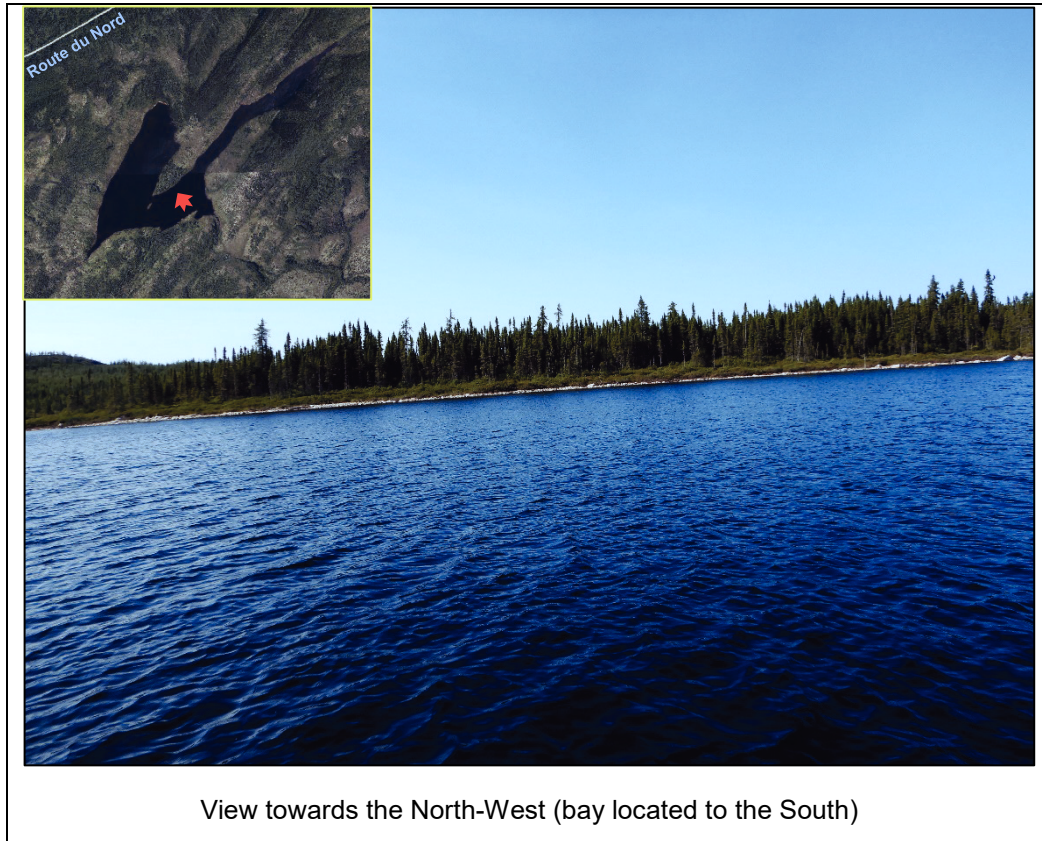
C.2 Lake Coulombe

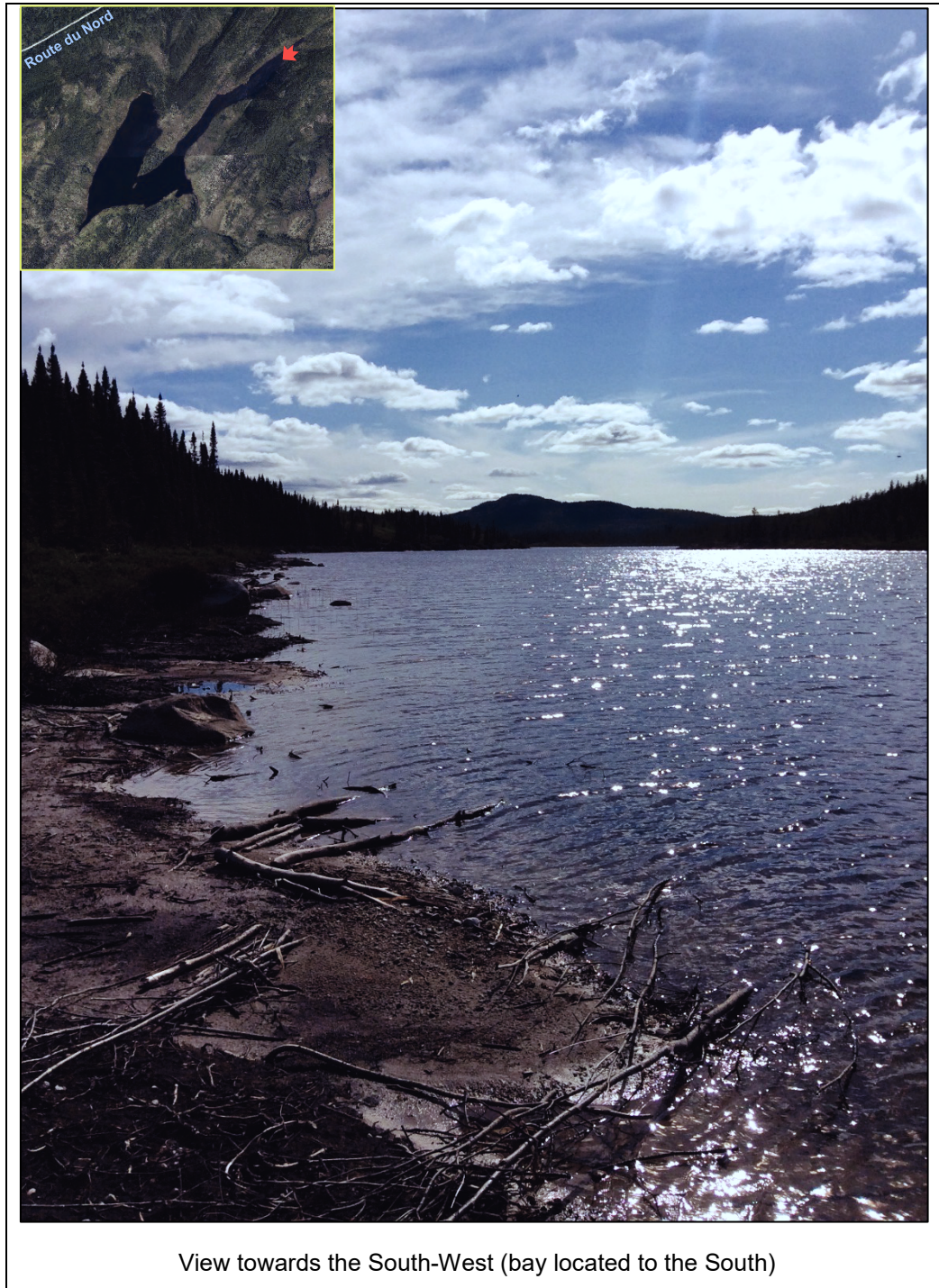


View towards the North-East (bay located to the South)







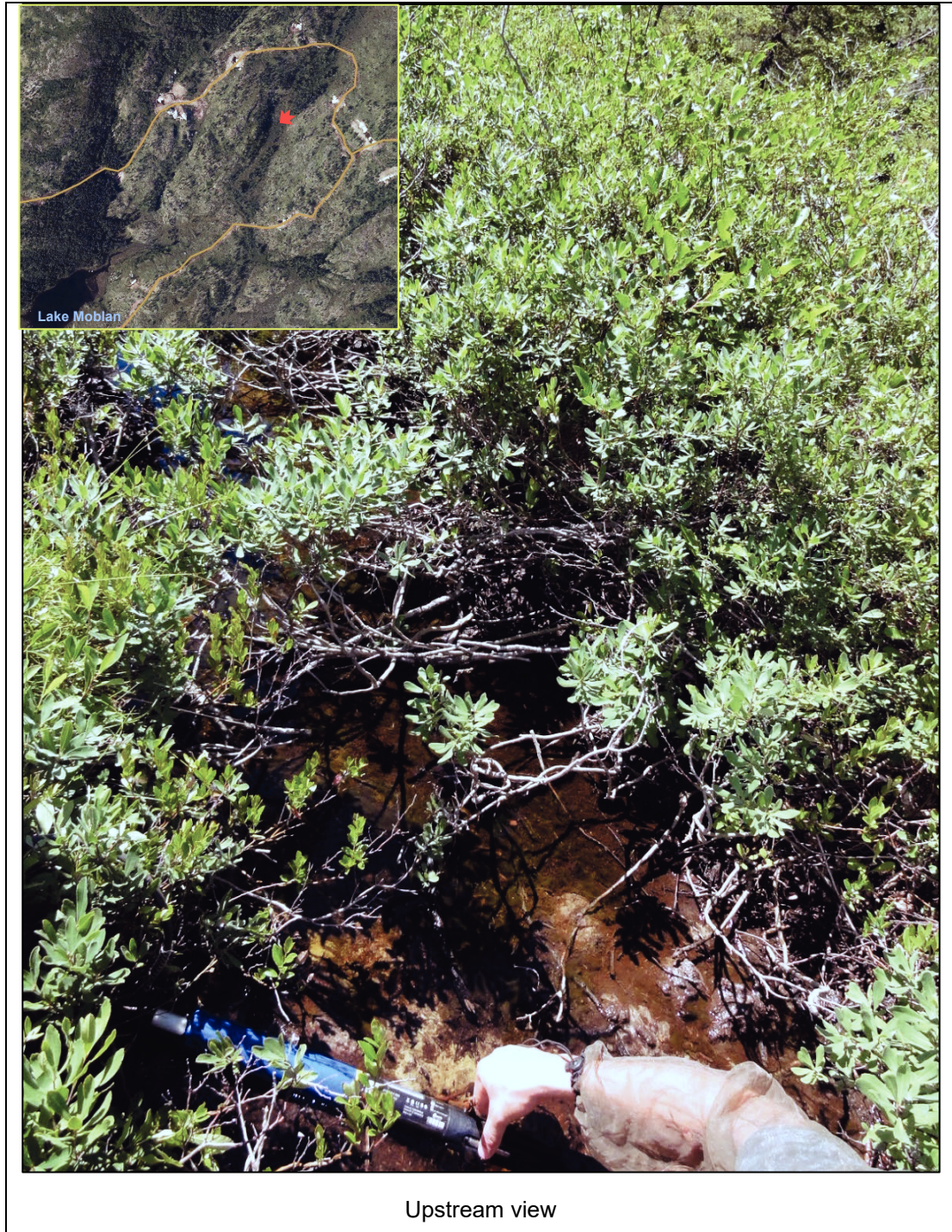


View towards the South-West (bay located to the South)



View towards the North-East (bay located to the South)

C.3 Unnamed Stream #7 Lake Moblan Area



Upstream view



Downstream view



View of the right bank





View of the canopy



View of the substrate

C.4 Unnamed Stream #7 Lake Coulombe Area









View of the left bank



View of the canopy



View of the substrate

H357755

C.5 Unnamed Stream #6











View of the substrate

C.6 Unnamed Stream #5









View of the right bank



View of the canopy



View of the substrate

H357755

C.7 Unnamed Stream #8



Downstream view



Upstream view



View of the left bank



View of the right bank



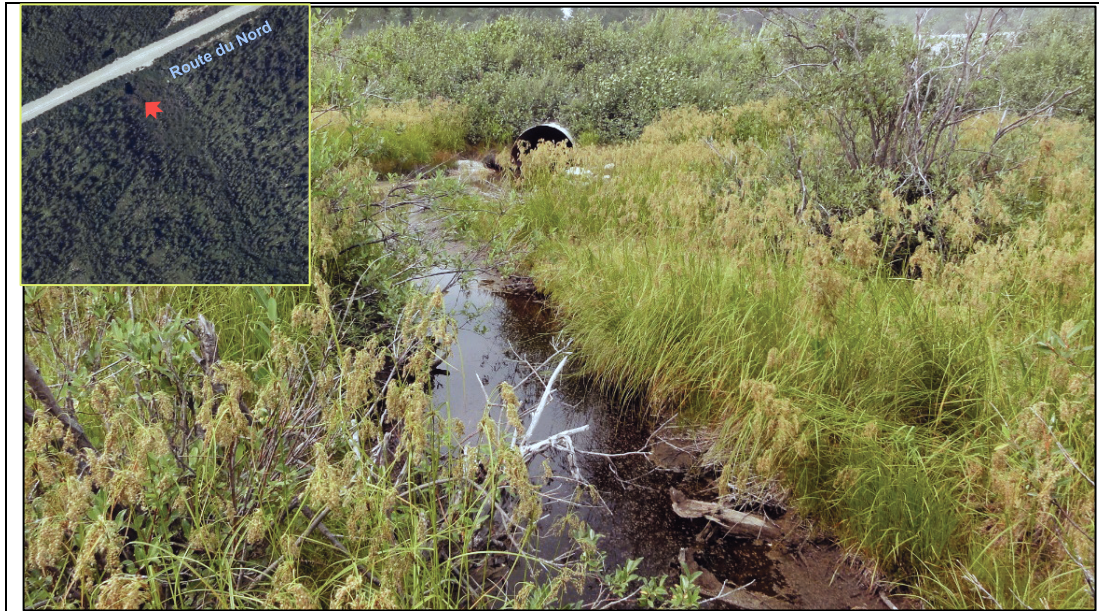
View of the canopy



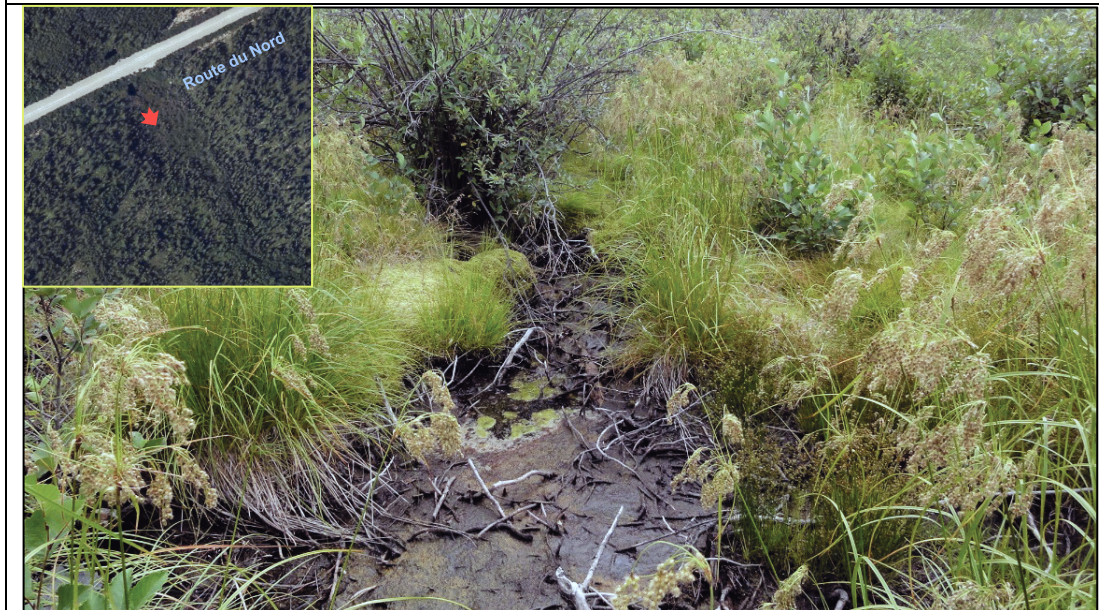
View of the substrate

H357755

C.8 Unnamed Stream #2



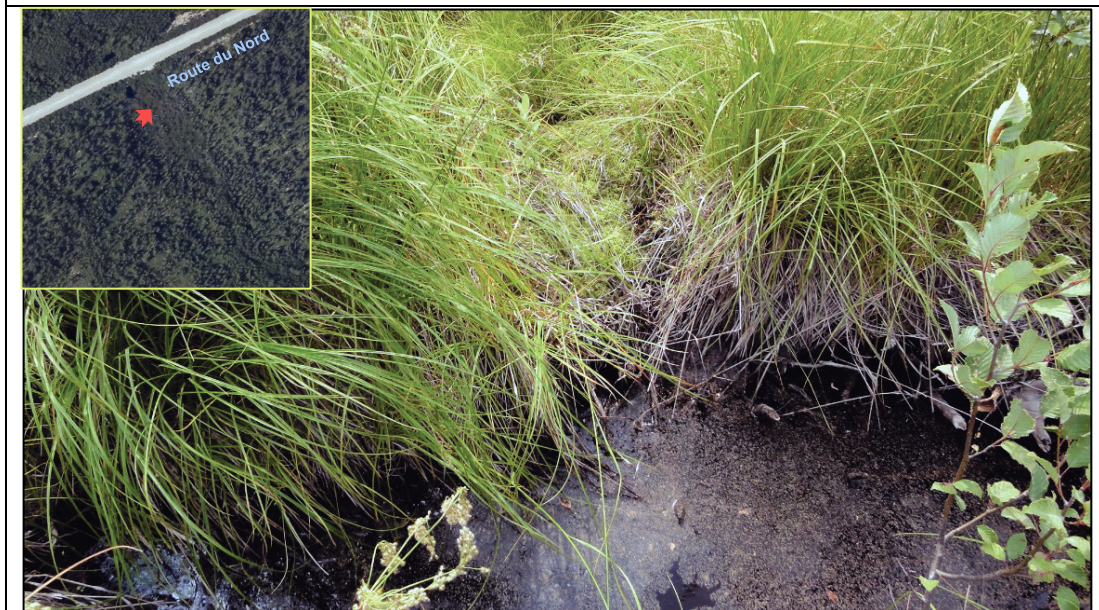
Downstream view



Upstream view



View of the left bank



View of the right bank



View of the canopy



View of the substrate

H357755

C.9 Unnamed pond #1





View to the South



View to the West

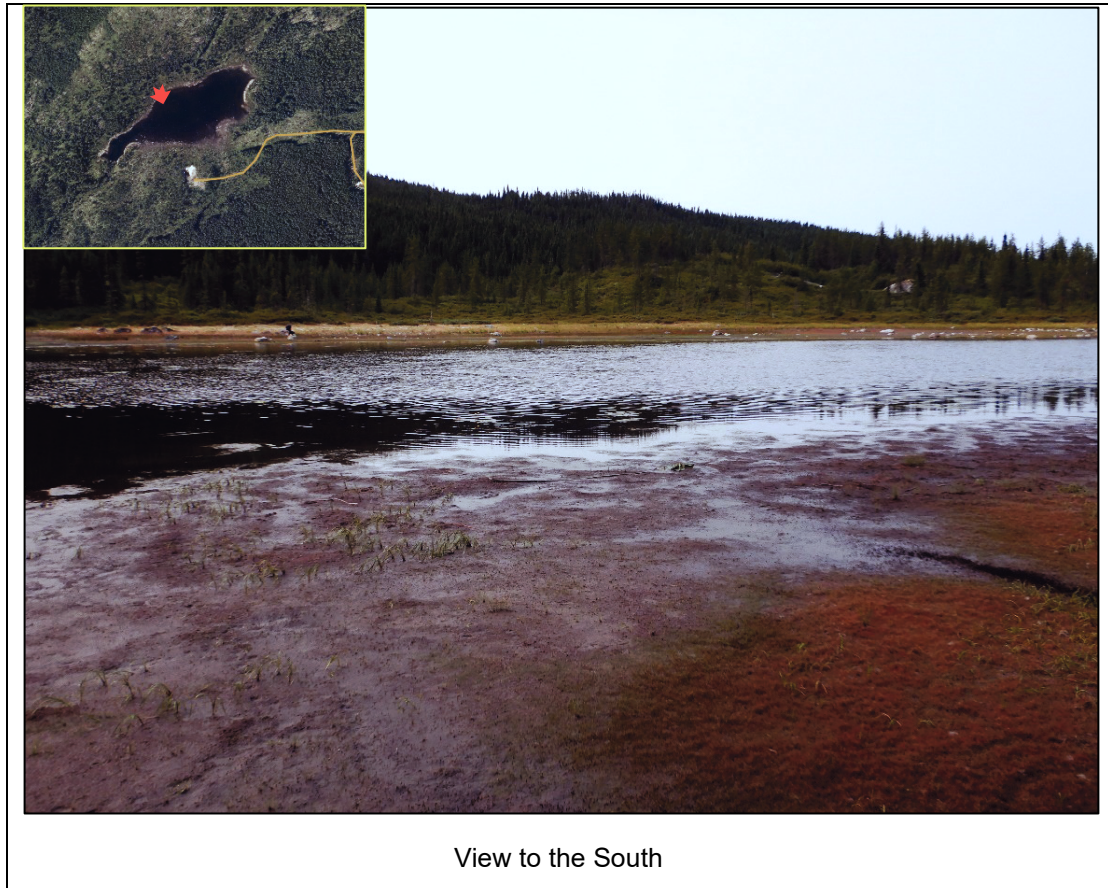


H357755

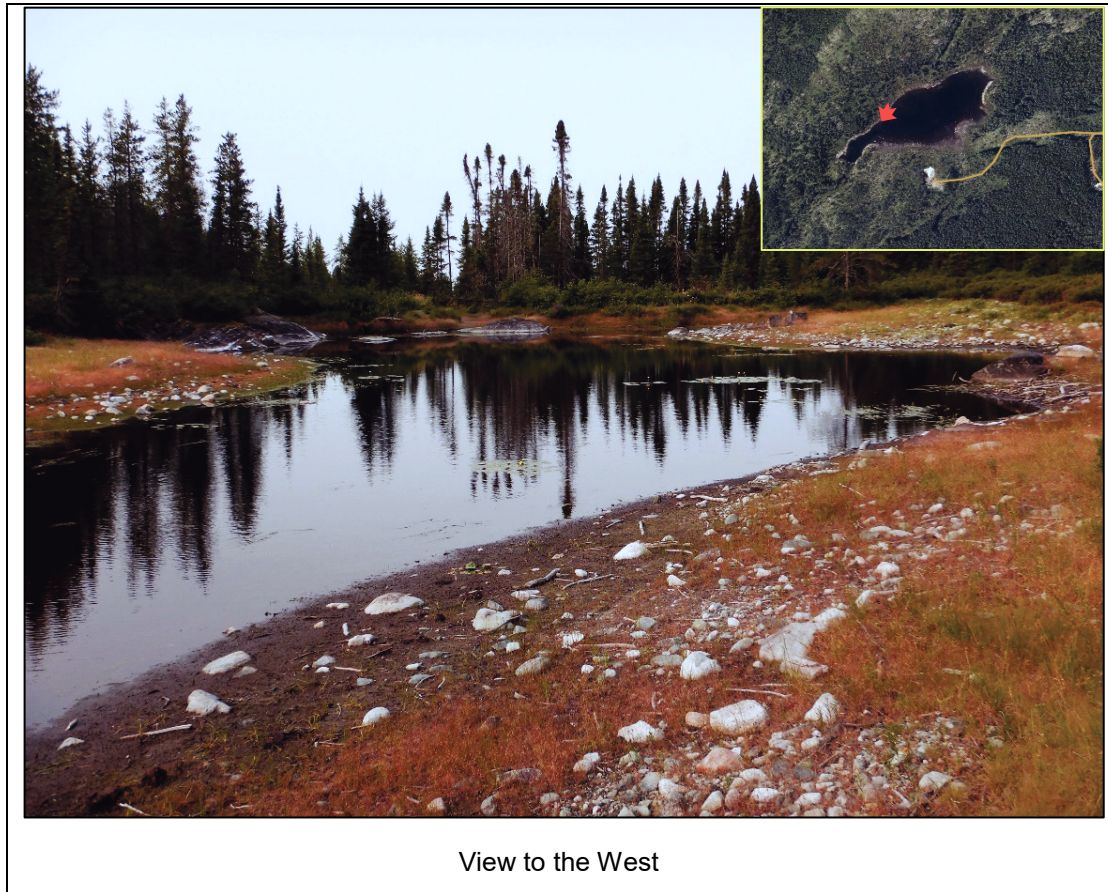
C.10 Unnamed pond #2



View to the North









View of the canopy



View of the substrate

H357755

C.11 Unnamed pond #6



View to the North





View to the East





View of the canopy



View of the substrate