

ANNEX XIV: APPENDIX C

SUBSTRATE MAPPING AND HYDROACOUSTIC SURVEY DATA

Maps

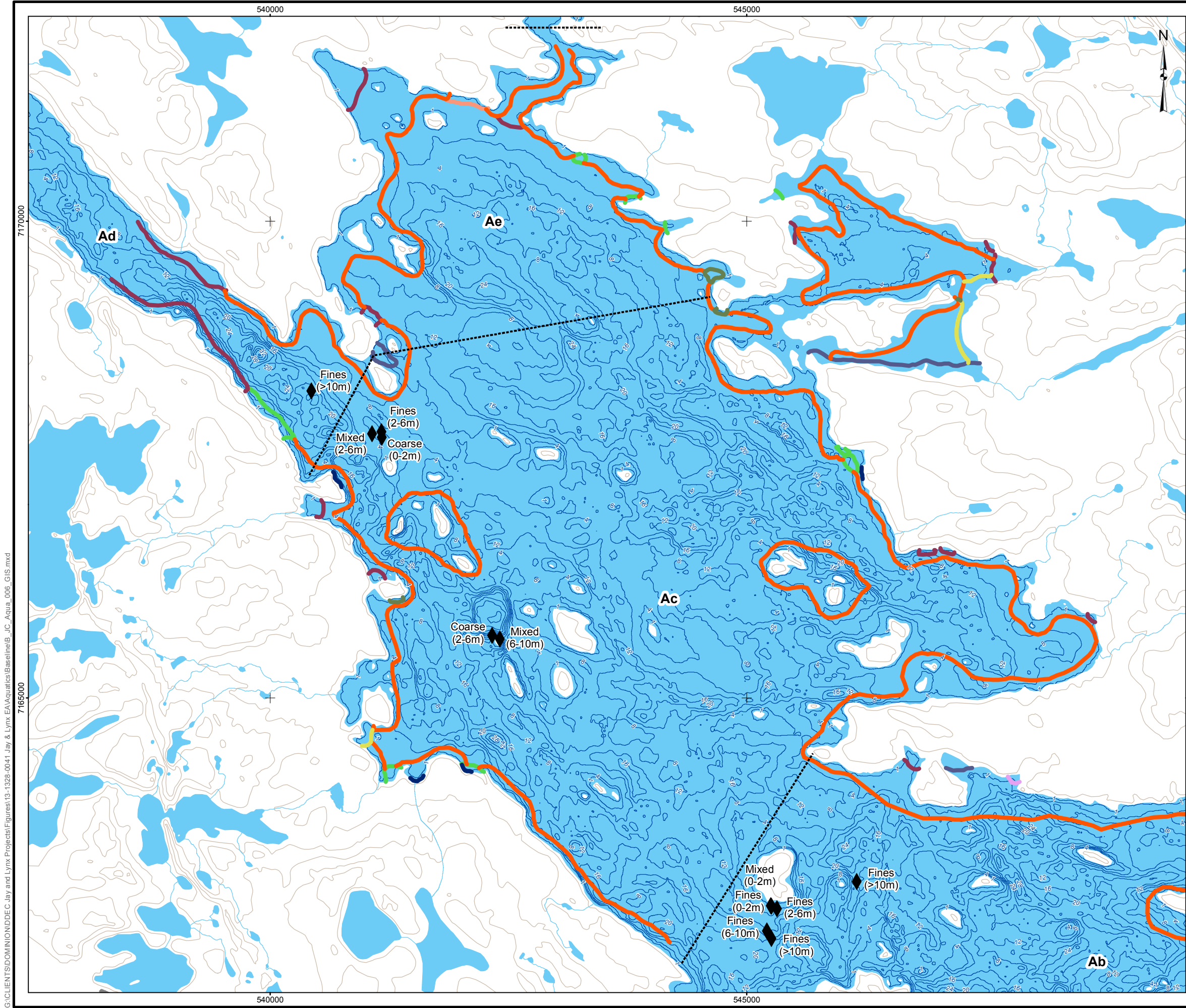
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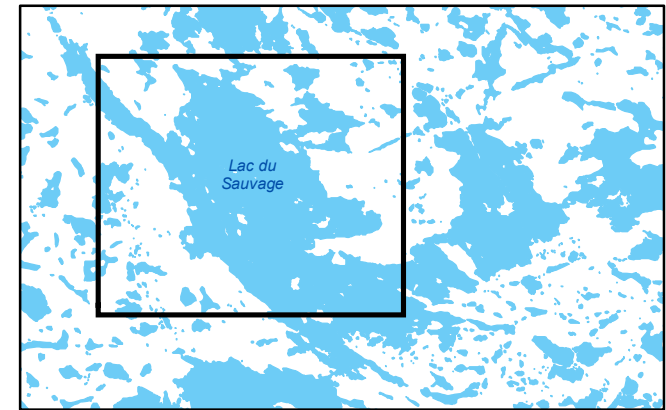


LEGEND

- BATHYMETRIC CONTOUR (4 m INTERVAL)
- ELEVATION CONTOUR (10 m INTERVAL)
- WATERCOURSE
- WATERBODY
- BASIN DIVIDE
- HYDROACOUSTIC SUBSTRATE CALIBRATION SITE

SUBSTRATE TYPE

- Bo - BOULDER
- Bo/Co - BOULDER/COBBLE
- Bo/Fi - BOULDER/FINES
- Br - BEDROCK
- Co/Bo - COBBLE/BOULDER
- Co/Fi - COBBLE/FINES
- Fi - FINES
- Fi/Bo - FINES/BOULDER
- Fi/Co - FINES/COBBLE

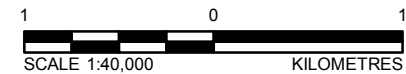


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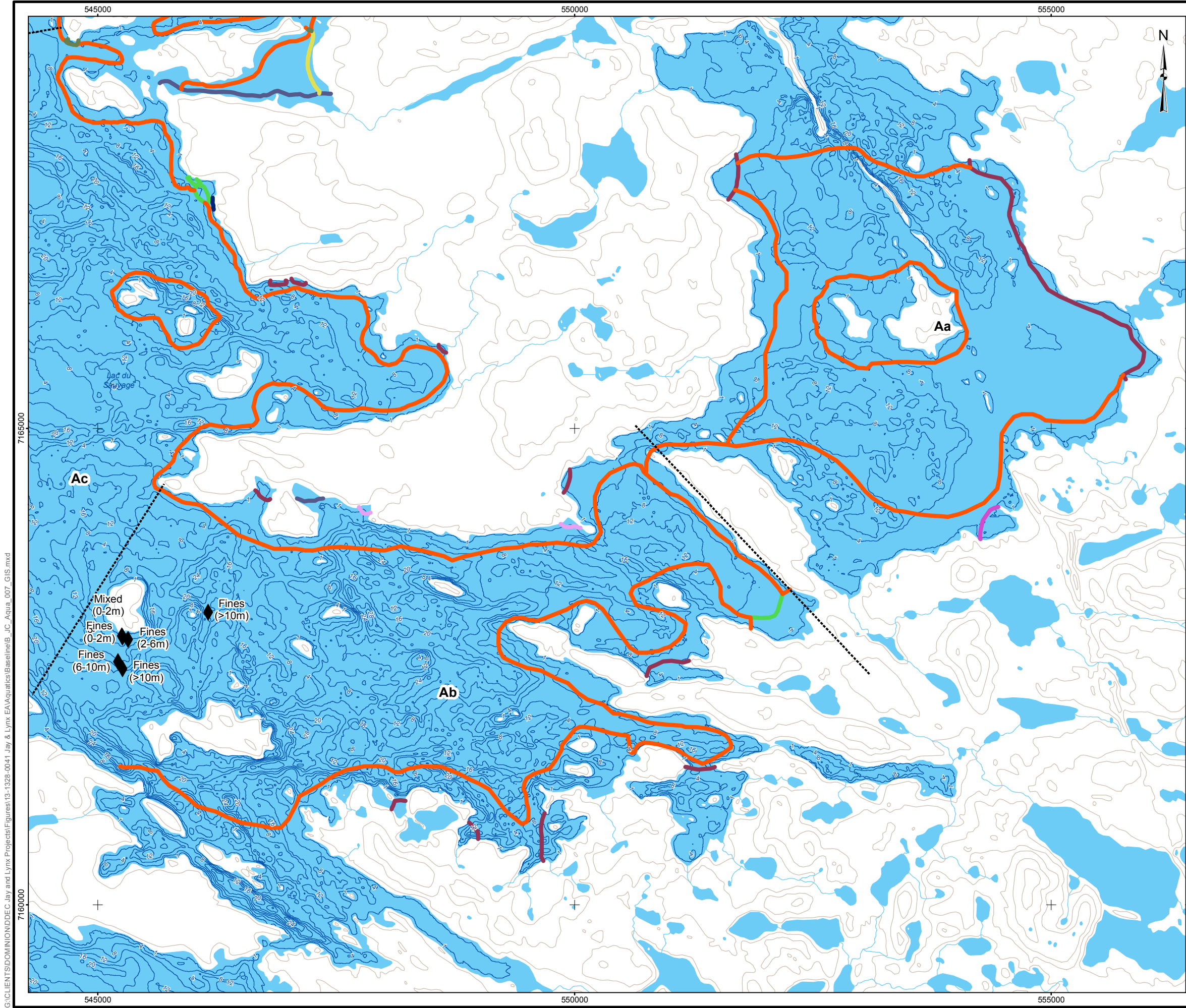
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BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

FISH AND FISH HABITAT BASELINE REPORT



	JAY PROJECT NORTHWEST TERRITORIES, CANADA			
	DIGITIZED FIELD SURVEY HABITAT MAP OF LAC DU SAUVAGE, 2013			
	PROJECT	13-1328-0041	FILE No. B_JC_Aqua_006_GIS	
	DESIGN	CS	29/01/14	SCALE AS SHOWN
	GIS	JG	09/09/14	REV 0
	CHECK	CG	09/09/14	MAP C-1A
REVIEW	SM	09/09/14		



LEGEND

- BATHYMETRIC CONTOUR (4 m INTERVAL)
- ELEVATION CONTOUR (10 m INTERVAL)
- WATERCOURSE
- WATERBODY
- BASIN DIVIDE
- HYDROACOUSTIC SUBSTRATE CALIBRATION SITE

SUBSTRATE TYPE

- Bo/Co - BOULDER/COBBLE
- Bo/Fi - BOULDER/FINES
- Br - BEDROCK
- Co/Bo - COBBLE/BOULDER
- Co/Fi - COBBLE/FINES
- Fi - FINES
- Fi/Bo - FINES/BOULDER
- Fi/Co - FINES/COBBLE
- Sa - SAND

REFERENCE

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BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

FISH AND FISH HABITAT BASELINE REPORT

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

Golders Associates

PROJECT	13-1328-0041	FILE No. B_JC_Aqua_007_GIS
DESIGN	CS	29/01/14
GIS	JG	09/09/14
CHECK	CG	09/09/14
REVIEW	SM	09/09/14

MAP C-1B

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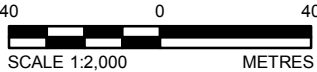
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BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
DATUM: NAD83 PROJECTION: UTM ZONE 12N

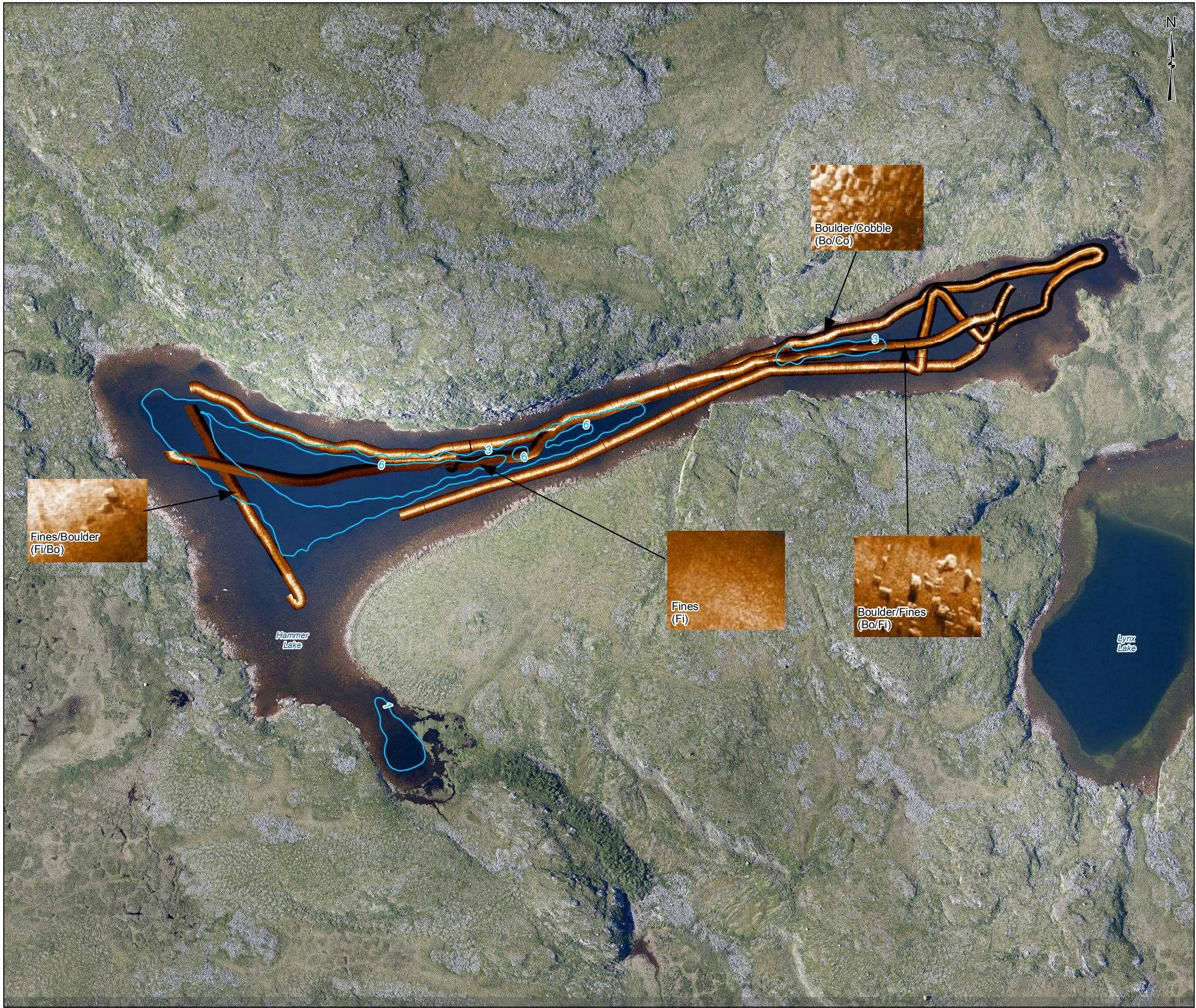
DOCUMENT

FISH AND FISH HABITAT BASELINE REPORT



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	GIS	JG	10/09/14	MAP C-2	
	CHECK	CG	10/09/14		
	REVIEW	SM	10/09/14		

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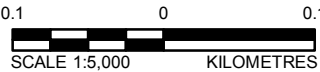
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DOCUMENT

FISH AND FISH HABITAT BASELINE REPORT



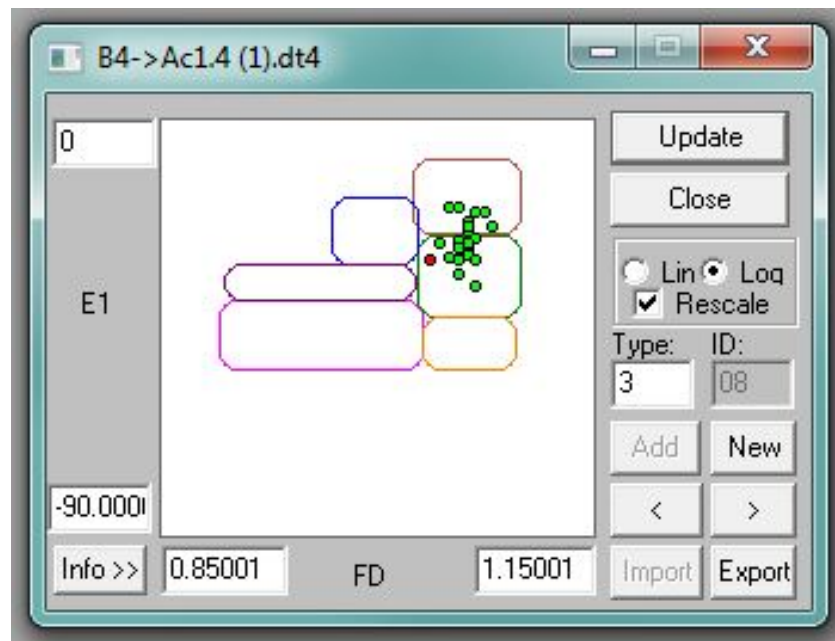
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TITLE GEOREFERENCED ORTHOPHOTOGRAPH WITH SIDE SCAN IMAGERY FOR HAMMER LAKE SHOWING SUBSTRATE TYPES						
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		GIS	JG	10/09/14	MAP C-3	
		CHECK	CG	10/09/14		
		REVIEW	SM	10/09/14		

Table C-1 Select Anchored Locations for Ground-Truthing Hydroacoustic Data Using Ekman Grabs and Underwater Photographs

Confirmed Substrate Type	Depth	Substrate ID	Biosonics Filename	Easting	Northing
Fines	2-6 m	F2-6-1	LDS_CAL_2to6 fines with veg	545318	7162782
Fines	0-2 m	F>2-1	LDS_CAL_0-2_sand	545259	7162809
Mixed	0-2 m	M>2-1	CAL 0-2 mixed SaBo	545253	7162817
Fines	6-10 m	F6-10-1	CAL 6-10 Fines	545212	7162551
Fines	>10 m	F10+-1	CAL 10+ Fine	545260	7162474
Fines	>10 m	U10+-1	CAL 10+ Si veg pos hard under	546156	7163069
Fines	2-6 m	U2-6-1	CAL 2-6 Undetermined	541070	7167767
Coarse	0-2 m	C>2-1	CAL 0-2 Rock	541172	7167734
Mixed	2-6 m	M2-6-1	CAL 2-6 mixed	541167	7167790
Fines	>10 m	F10+-2	CAL 10+ Fines	540434	7168220
Mixed	6-10 m	U6-10-1	CAL 6-10 Fines near shore	542412	7165616
Coarse	2-6 m	C2-6-1	CAL 2-6 rock	542330	7165652

m = metre; ID = identification; > = greater than.

Figure C-1 Screenshot of Cluster Analysis of Bottom Types of Lac du Sauvage Using Visual Bottom typer Software's Fractal Dimension Method



Notes: Green ping represents a single ping and red ping is the average ping of 100 individual pings; each bottom type is represented by a distinctly coloured box: soft fines (organics, mud) - pink; exposed coarse (boulder/cobble/Gr) - brown; dense fines (silt, clay) - green; exposed coarse (boulder/cobble) - blue; mixed (boulder/fines) - purple; and hard/loose fines (sand) - yellow.

Table C-2 Percentage of Substrate Composition of Transects Covered on Lac du Sauvage

Substrate Type Identified by VBT Software	Depth			
	0-2 m	2-6 m	6-10 m	>10 m
1 (soft fines)	9.15	28.54	13.46	6.93
2 (exposed coarse)	51.63	32.94	3.94	0.00
3 (dense fines)	33.99	26.09	56.03	93.02
4 (exposed coarse)	0.65	1.11	0.97	0.00
5 (mixed fines with coarse)	2.61	9.20	25.11	0.00
6 (loose fines)	1.96	2.12	0.49	0.05

Note: There are two exposed coarse groups because their calibrated substrate files did not conform to a box-shaped cluster (Figure C-1). To reduce the amount of overlap between dense fines and substrate types, two "coarse" clusters were created.

VBT = Visual Bottom Typer; > = greater than; m = metre.

Table C-3 Night Weather Conditions at the Ekati Mine During Hydroacoustics Field Programs in the Lac du Sauvage Study Area, 2013

Date (Time)	Temperature (°C)			Wind Speed (m/s)		
	Mean	Min	Max	Mean	Min	Max
31-July (4:00 to 7:00)	7.38	7.2	7.7	8.26	7.22	9.17
1-August (4:00 to 7:00)	7.35	7	7.8	2.57	1.67	3.61
1-August (21:00) to 2-August (7:00)	10.49	9.3	13.3	3.26	1.94	4.17
2-August (21:00) to 3-August (7:00)	12.26	10.7	14.3	1.99	0	5.28
3-August (21:00) to 4-August (7:00)	14.02	11	16.7	3.59	1.11	4.72
4-August (21:00) to 5-August (7:00)	14.13	11.9	16.4	1.54	0	4.17
5-August (21:00) to 6-August (7:00)	11.07	9.7	15.1	2.6	0	4.72
7-August (4:00 to 7:00)	12.13	9.4	14.8	2.5	1.67	3.61
8-August (4:00 to 7:00)	11.88	9.4	14.3	2.64	1.94	4.17
9-August (4:00 to 7:00)	13.03	11.2	15.1	1.67	1.67	1.67
10-August (4:00 to 7:00)	14.03	11.7	16.4	2.92	2.5	3.61
11-August (4:00 to 7:00)	15.63	13.2	19.1	0.42	0	1.67
12-August (4:00 to 7:00)	17.08	15.8	20.4	0	0	0
13-August (4:00 to 7:00)	10.49	9.3	13.3	3.26	1.94	4.17
14-August (4:00 to 7:00)	12.26	10.7	14.3	1.99	0	5.28
14-August (21:00) to 15-August (7:00)	14.02	11	16.7	3.59	1.11	4.72
15-August (21:00) to 16-August (7:00)	14.13	11.9	16.4	1.54	0	4.17
16-August (21:00) to 17-August (7:00)	11.07	9.7	15.1	2.6	0	4.72
17-August (21:00) to 18-August (7:00)	12.61	11.3	14.8	3.96	3.06	5.28

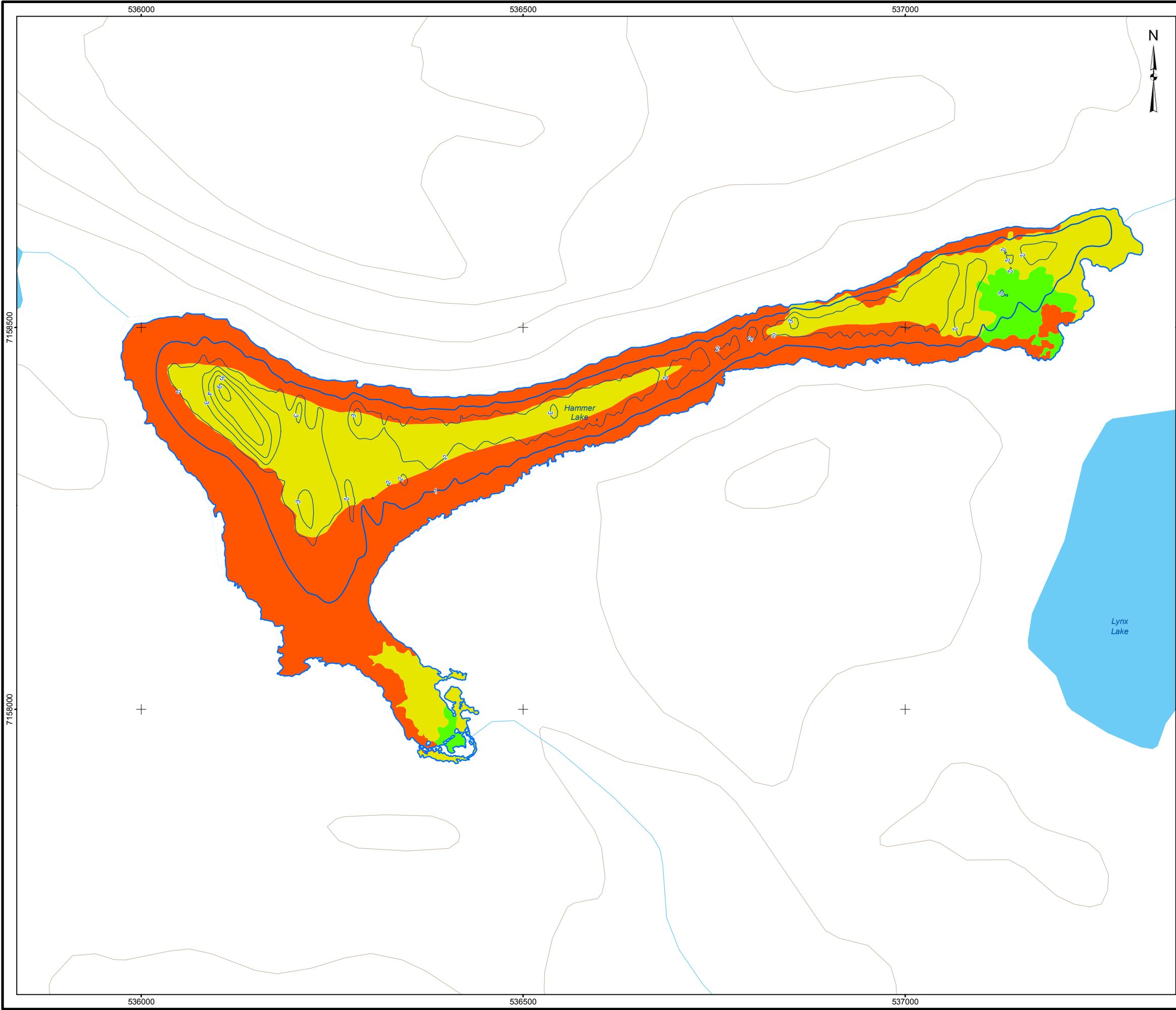
Table C-3 Night Weather Conditions at the Ekati Mine During Hydroacoustics Field Programs in the Lac du Sauvage Study Area, 2013

Date (Time)	Temperature (°C)			Wind Speed (m/s)		
	Mean	Min	Max	Mean	Min	Max
18-August (21:00) to 19-August (7:00)	14.13	13.4	15.1	2.37	1.67	3.06
19-August (21:00) to 20-August (7:00)	10.35	8	13.6	4.76	2.69	6.67
20-August (21:00) to 21-August (7:00)	7.80	6.1	10.2	4.76	3.06	6.69
22-August (4:00 to 7:00)	10.15	9.8	10.4	1.39	0	1.94

Note: Shaded rows represent survey days.

°C = degrees Celsius; m/s = metres per second; min = minimum; max = maximum.

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LEGEND

- BATHYMETRIC CONTOUR (1 m INTERVAL)
- ELEVATION CONTOUR (10 m INTERVAL)
- WATERCOURSE
- WATERBODY
- SUBSTRATE TYPE
 - Bo/Co - BOULDER/COBBLE
 - Bo/Fi - BOULDER/FINES
 - Fi/Bo - FINES/BOULDER

Lynx Lake

Substrate Type		Proportion (%) of Habitat
Fi	Fines	47.0
Bo/Co	Boulder/Cobble	34.6
Fi/Bo	Fines/Boulder	13.1
Bo/Fi	Boulder/Fines	5.1
Br	Bedrock	0.3

Hammer Lake

Substrate Type		Proportion (%) of Habitat
Bo/Co	Boulder/Cobble	59.2
Fi/Bo	Fines/Boulder	36.6
Bo/Fi	Boulder/Fines	4.2

REFERENCE

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NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

FISH AND FISH HABITAT BASELINE REPORT

PROJECT
DOMINION DIAMOND

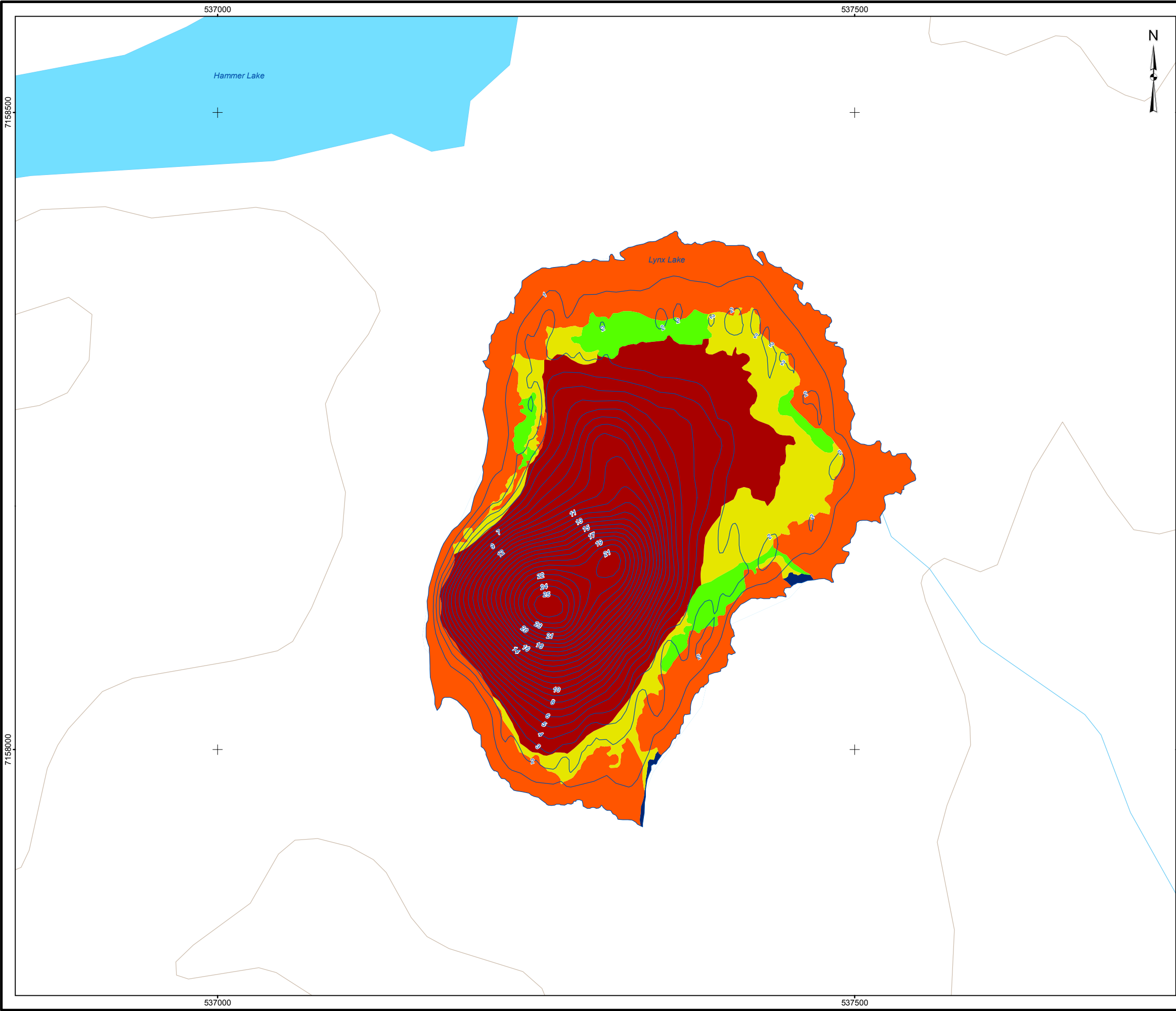
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
DIGITIZED HABITAT MAP OF HAMMER LAKE USING ORTHOPHOTO IMAGERY, GROUND-TRUTHED HABITAT MAP AND SIDESCAN IMAGERY

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DESIGN	CS	29/01/14
GIS	JG	09/09/14
CHECK	CG	09/09/14
REVIEW	SM	09/09/14

MAP C-4

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LEGEND

BATHYMETRIC CONTOUR (1 m INTERVAL)

ELEVATION CONTOUR (10 m INTERVAL)

WATERCOURSE

WATERBODY

SUBSTRATE TYPE

Bo/Co - BOULDER/COBBLE

Bo/Fi - BOULDER/FINES

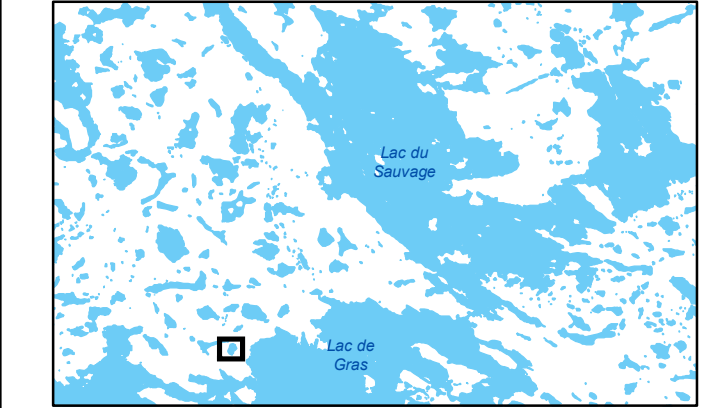
Br - BEDROCK

Fi - FINES

Fi/Bo - FINES/BOULDER

Lynx Lake		
Substrate Type		Proportion (%) of Habitat
Fi	Fines	47.0
Bo/Co	Boulder/Cobble	34.6
Fi/Bo	Fines/Boulder	13.1
Bo/Fi	Boulder/Fines	5.1
Br	Bedrock	0.3

Hammer Lake		
Substrate Type		Proportion (%) of Habitat
Bo/Co	Boulder/Cobble	59.2
Fi/Bo	Fines/Boulder	36.6
Bo/Fi	Boulder/Fines	4.2

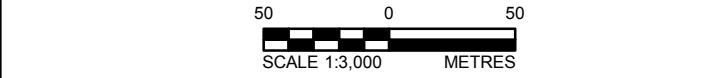


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BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
DATUM: NAD83 PROJECTION: UTM ZONE 12N

DOCUMENT

FISH AND FISH HABITAT BASELINE REPORT



PROJECT

 DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

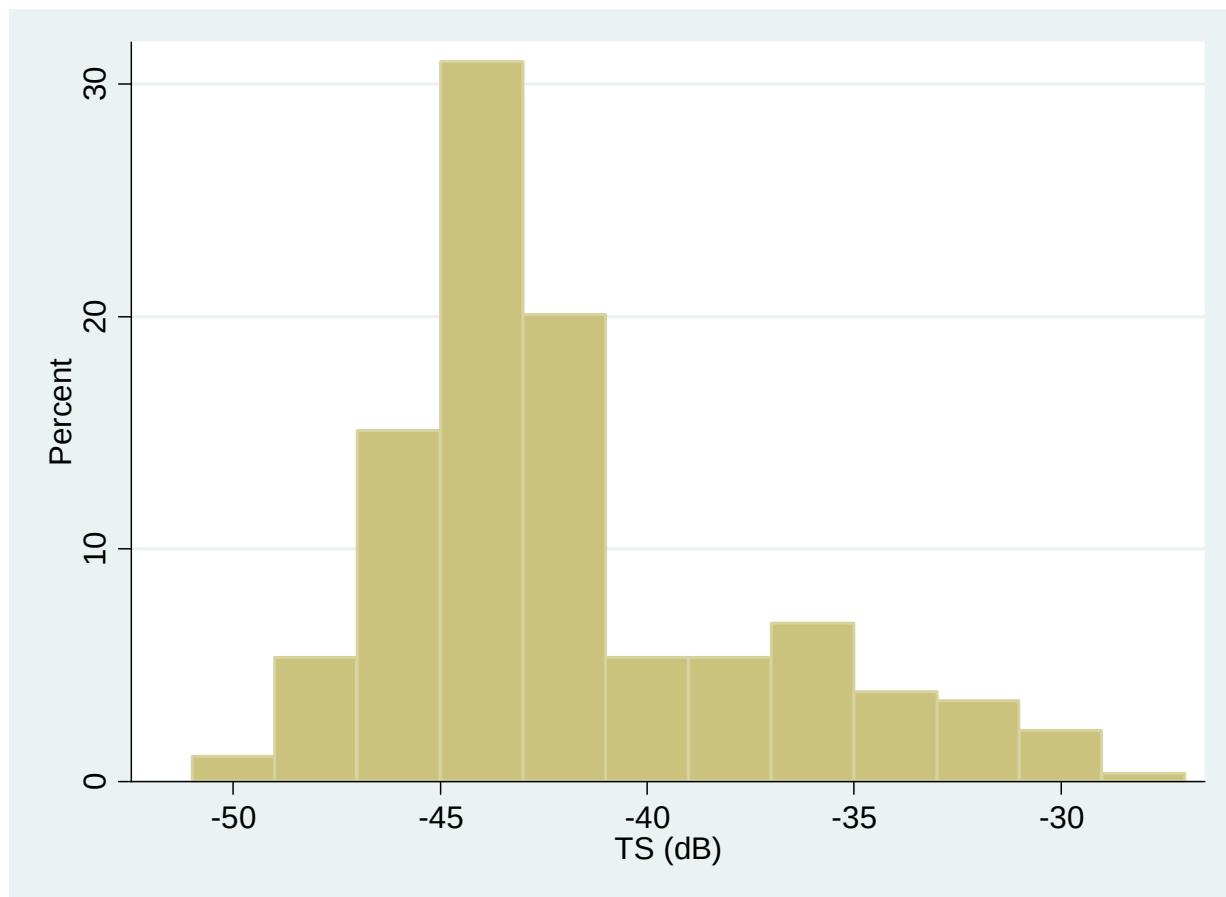
DIGITIZED HABITAT MAP OF LYNX LAKE USING
ORTHOPHOTO IMAGERY, GROUND-TRUTHED
HABITAT MAP AND SIDESCAN IMAGERY

 Golder Associates

PROJECT	13-1328-0041	FILE No. B_JC_Aqua_014_GIS
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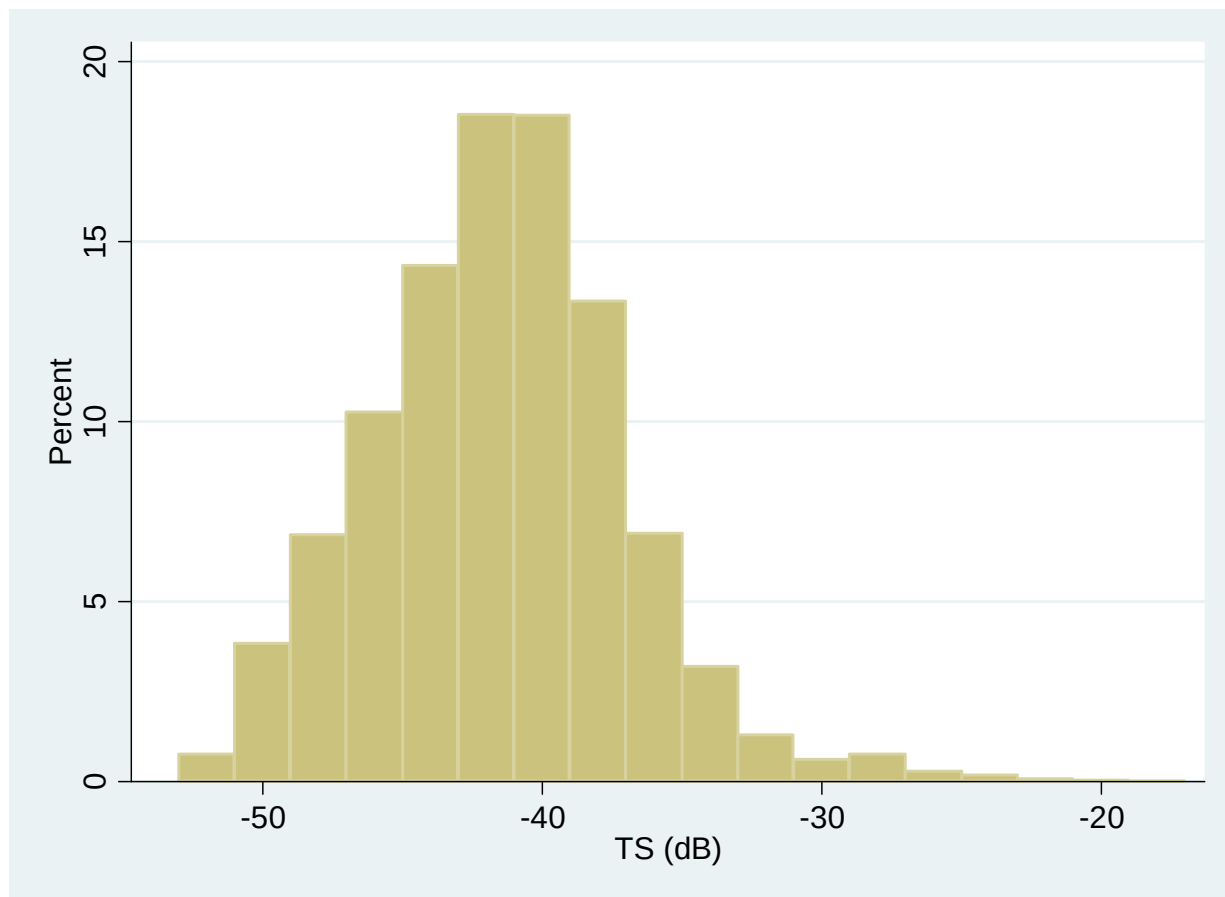
MAP C-5

Figure C-2 Histogram of Mean Target Strengths for Fish Tracks Detected in the Vertical Beam for Lac du Sauvage



dB = decibel; TS = target strength; presented using 2 dB bins.

Figure C-3 Histogram of Hydroacoustic Target Strengths for Fish Tracks Detected in the Horizontal Beam for Lac du Sauvage



dB = decibel; TS = target strength; presented using 2 dB bins.