

Sampling Location in Reference Lake D, Doris North Project, 2015

Figure A.1-6

Sampling Locations in Roberts Bay,
Doris North Project, 2015

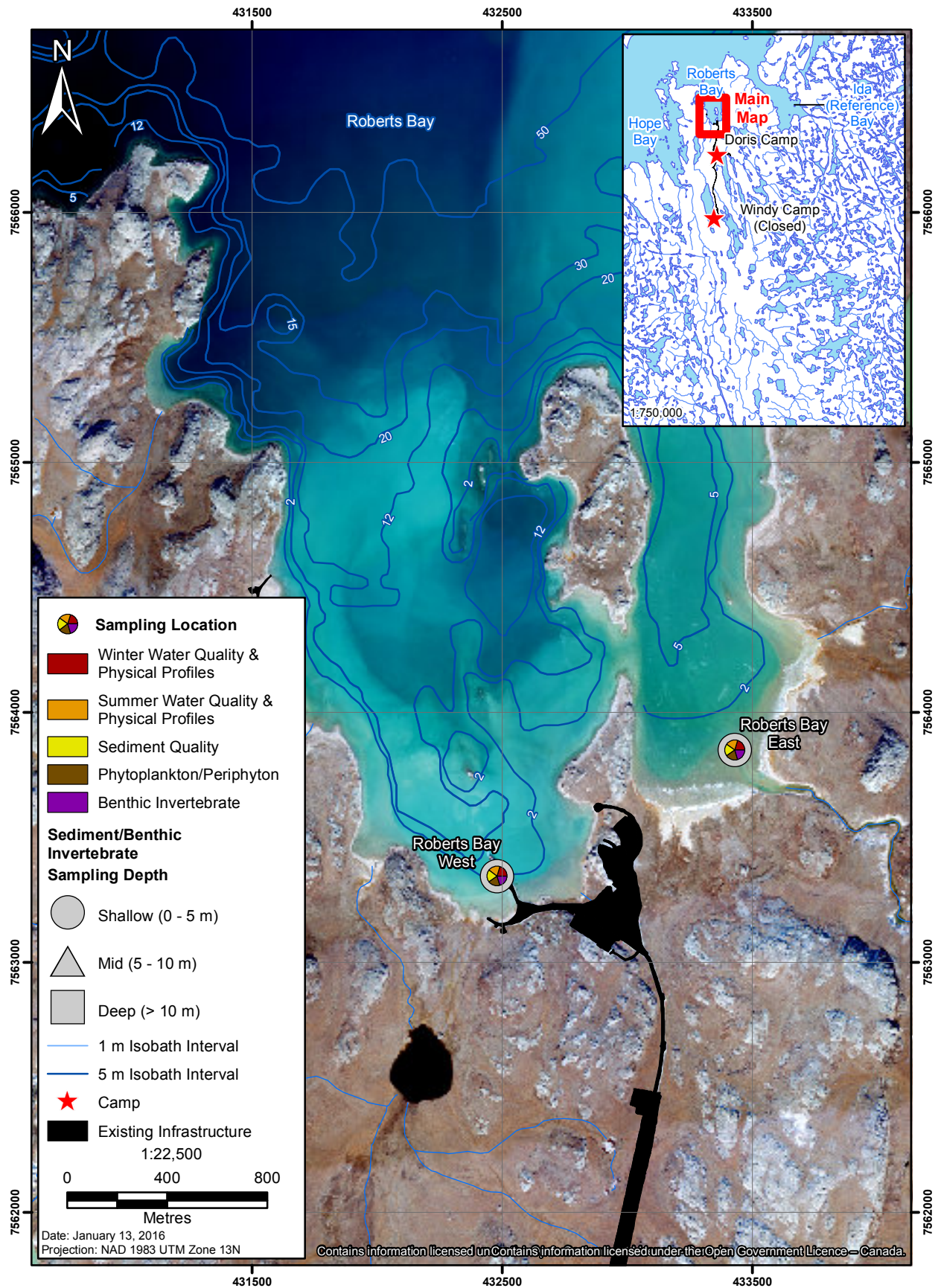
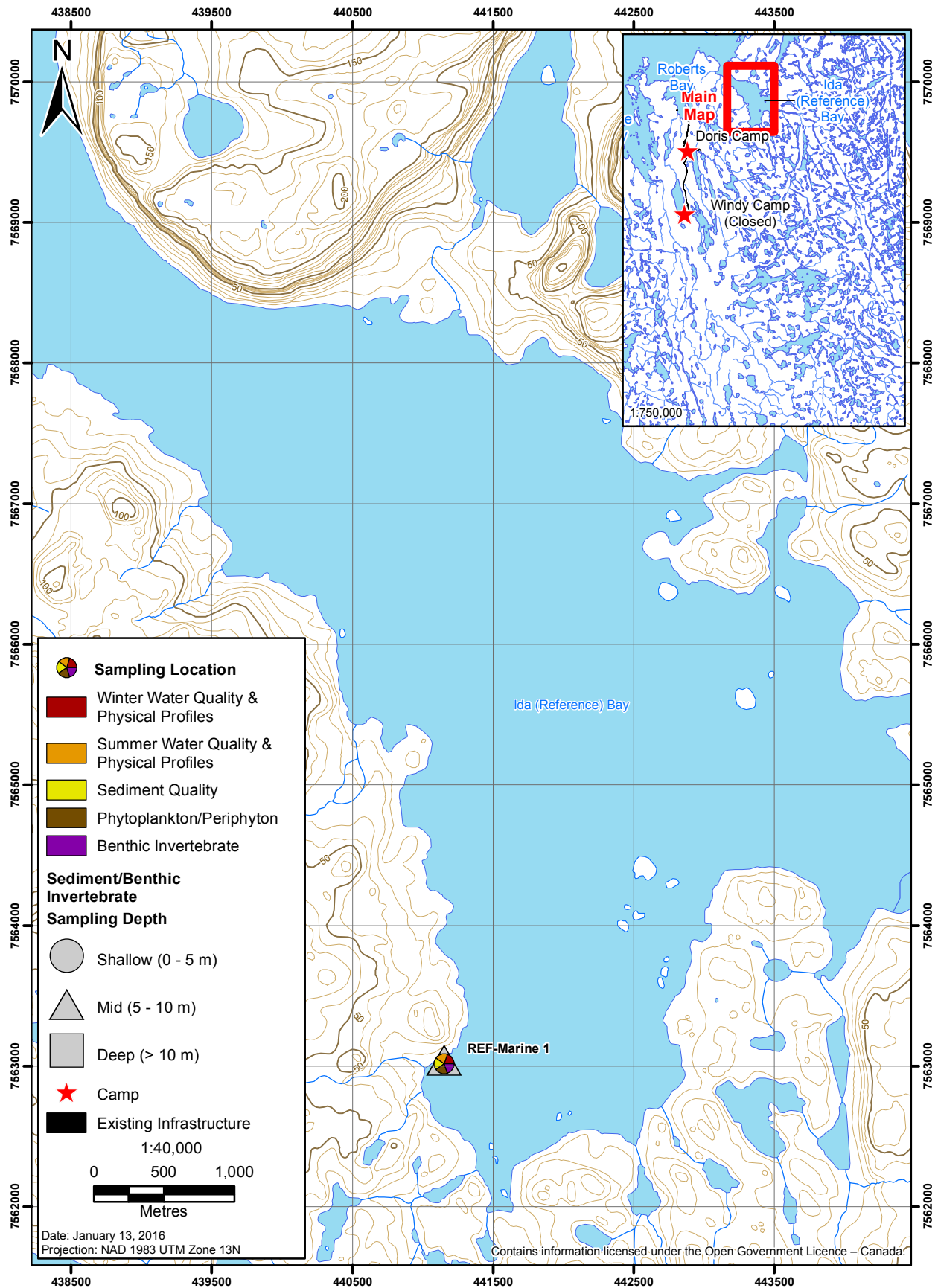


Figure A.1-7

Sampling Location in Ida (Reference) Bay,
Doris North Project, 2015



A.2 2015 PHYSICAL PROFILES AND SECCHI DEPTHS

The following sections present the Secchi depth data and the physical profiles collected from April to September 2015 at stream, lake, and marine sites.

A.2.1 Stream Data

Stream water temperatures measured between June 13 and September 20, 2015 are shown in Table A.2-1.

Table A.2-1. Stream Water Temperatures, Doris North Project, 2015

Stream	Date			
	June 13-14	July 16-18	August 13-16	September 16-20
Doris Outflow	4.0°C	11.3°C	12.6°C	6.3°C
Roberts Outflow	3.5°C	12.2°C	12.2°C	6.7°C
Little Roberts Outflow	4.3°C	14.4°C	12.8°C	4.0°C
Reference B Outflow	3.0°C	14.6°C	13.3°C	5.0°C
Reference D Outflow	0.8°C	14.5°C	12.6°C	3.0°C

A.2.2 Lake Data

Lake Secchi depths and calculated euphotic zone depths (1% light level) are shown in Table A.2-2. Figures A.2-1 to A.2-5 show the temperature and dissolved oxygen profiles collected at lake sites from April to September 2015; Annex A.2-1 provides the profile data in tabular form.

Table A.2-2. Lake Secchi Depths and Euphotic Zone Depths, Doris North Project, 2015

Lake Site	Sampling Date	Secchi Depth (Ds) (m)	Euphotic Zone Depth 1% Light Level (m)
Large Lake Site			
Doris Lake South	July 18, 2015	1.5	4.1
	August 5, 2015	1.7	4.6
	September 17, 2015	1.0	2.7
Doris Lake North	July 18, 2015	1.4	3.8
	August 5, 2015	1.75	4.7
	September 17, 2015	1.1	2.7
Reference Lake B	July 16, 2015	6.5	17.6*
	August 11, 2015	7.45	20.2*
	September 18, 2015	6.0	16.2*
Small Lake Site			
Little Roberts Lake	July 15, 2015	2.0	5.4*
	August 10, 2015	1.3	3.5*
	September 19, 2015	1.4	3.8*
Reference Lake D	July 16, 2015	3.75	10.1*
	August 9, 2015	2.7	-
	September 19, 2015	1.8	4.9*

Notes: * indicates that the euphotic zone extended to the bottom of the water column.

- indicates that the euphotic zone depth was not calculated because the Secchi depth extended to the bottom of the water column.

Figure A.2-1

Temperature and Dissolved Oxygen Profiles
in Doris Lake South, Doris North Project, 2015

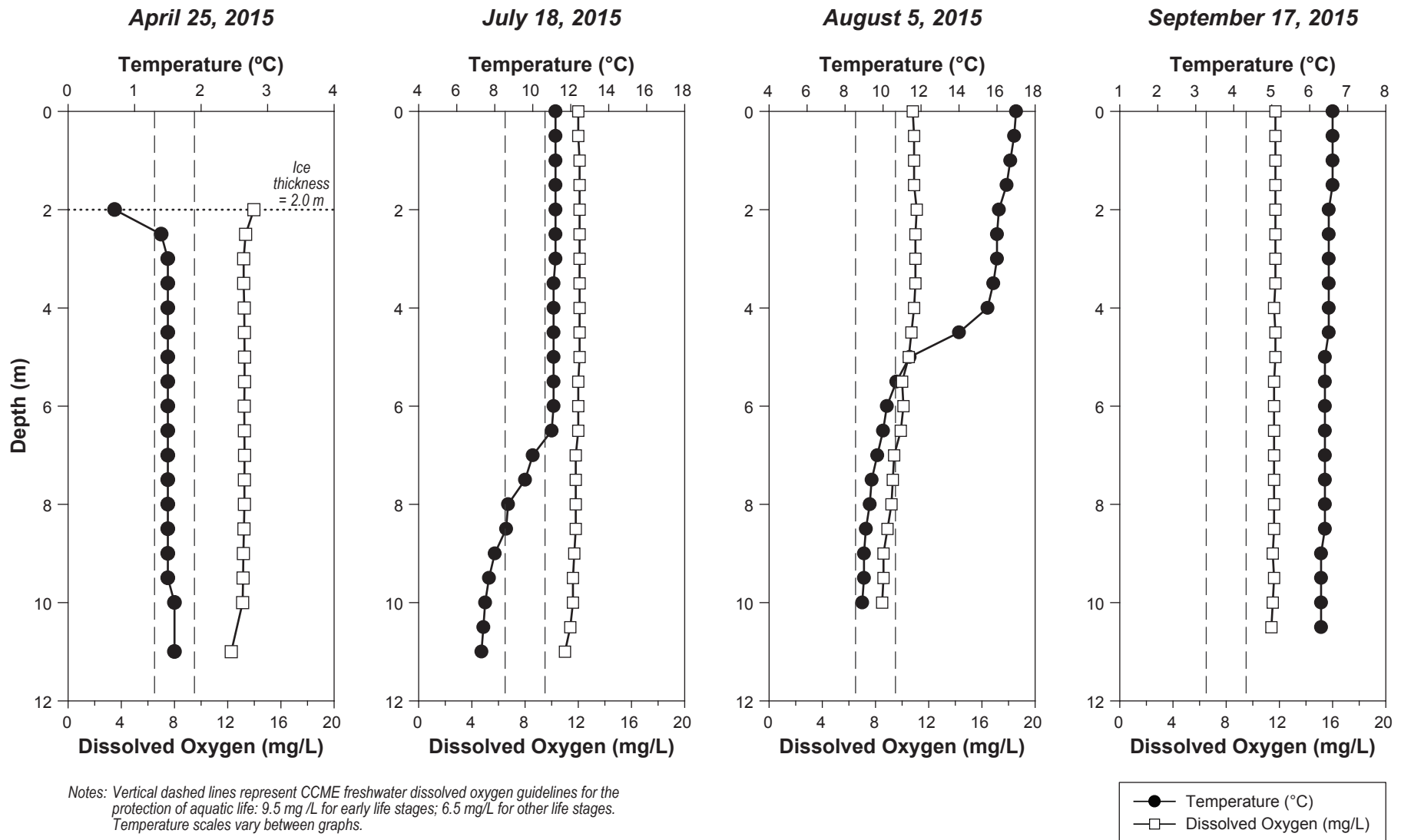


Figure A.2-2

Temperature and Dissolved Oxygen Profiles
in Doris Lake North, Doris North Project, 2015

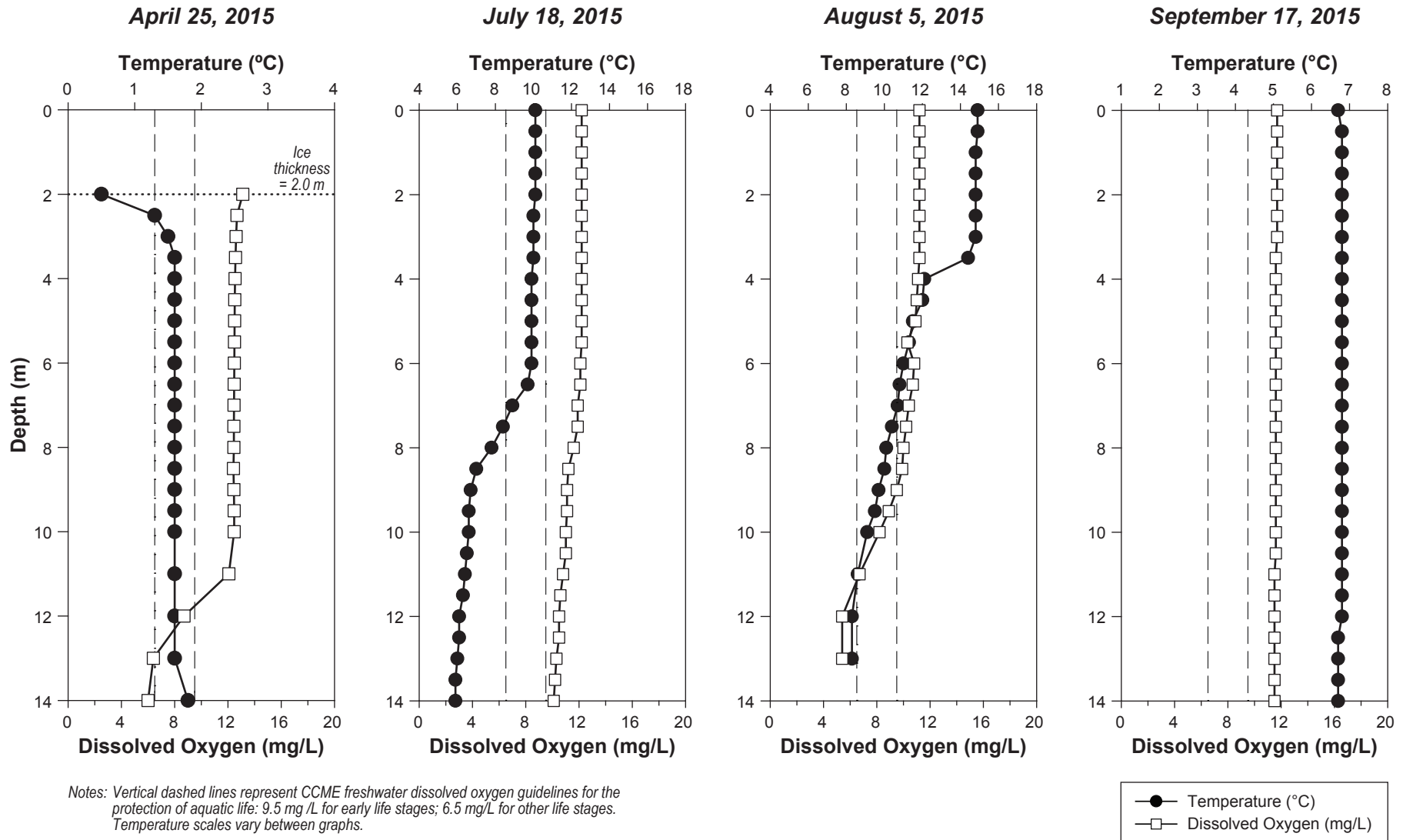


Figure A.2-3

Temperature and Dissolved Oxygen Profiles
in Reference Lake B, Doris North Project, 2015

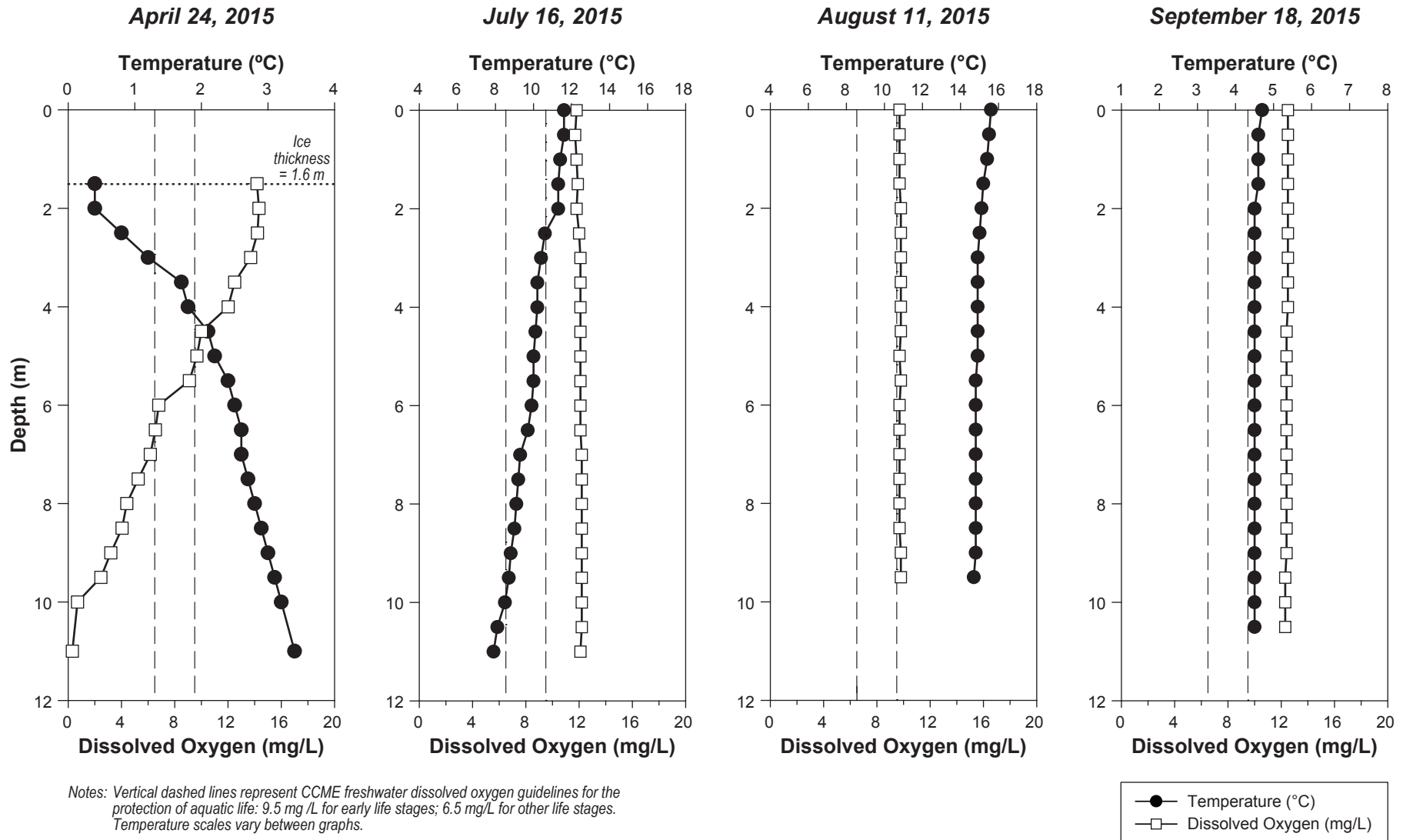


Figure A.2-4

Temperature and Dissolved Oxygen Profiles
in Little Roberts Lake, Doris North Project, 2015

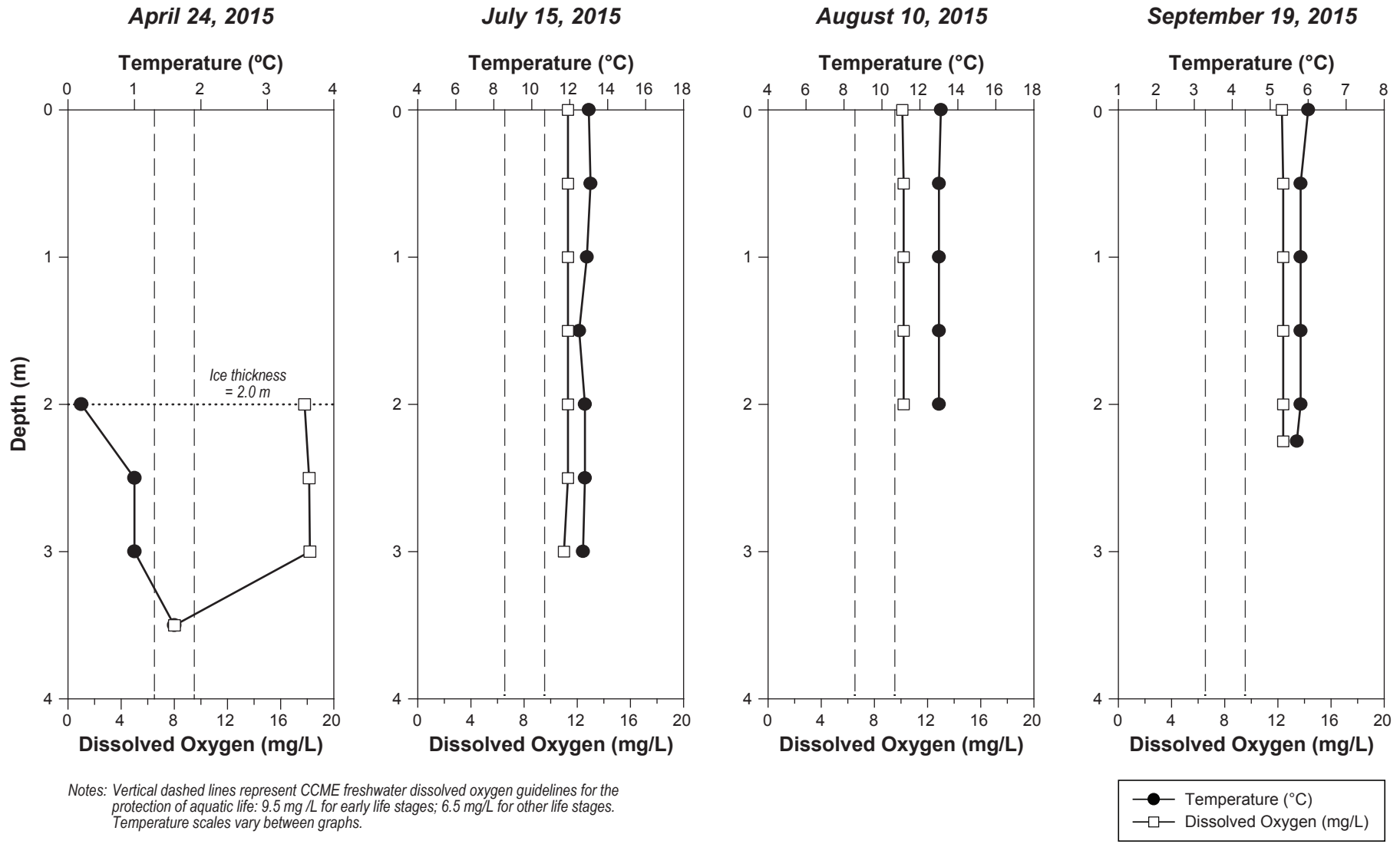
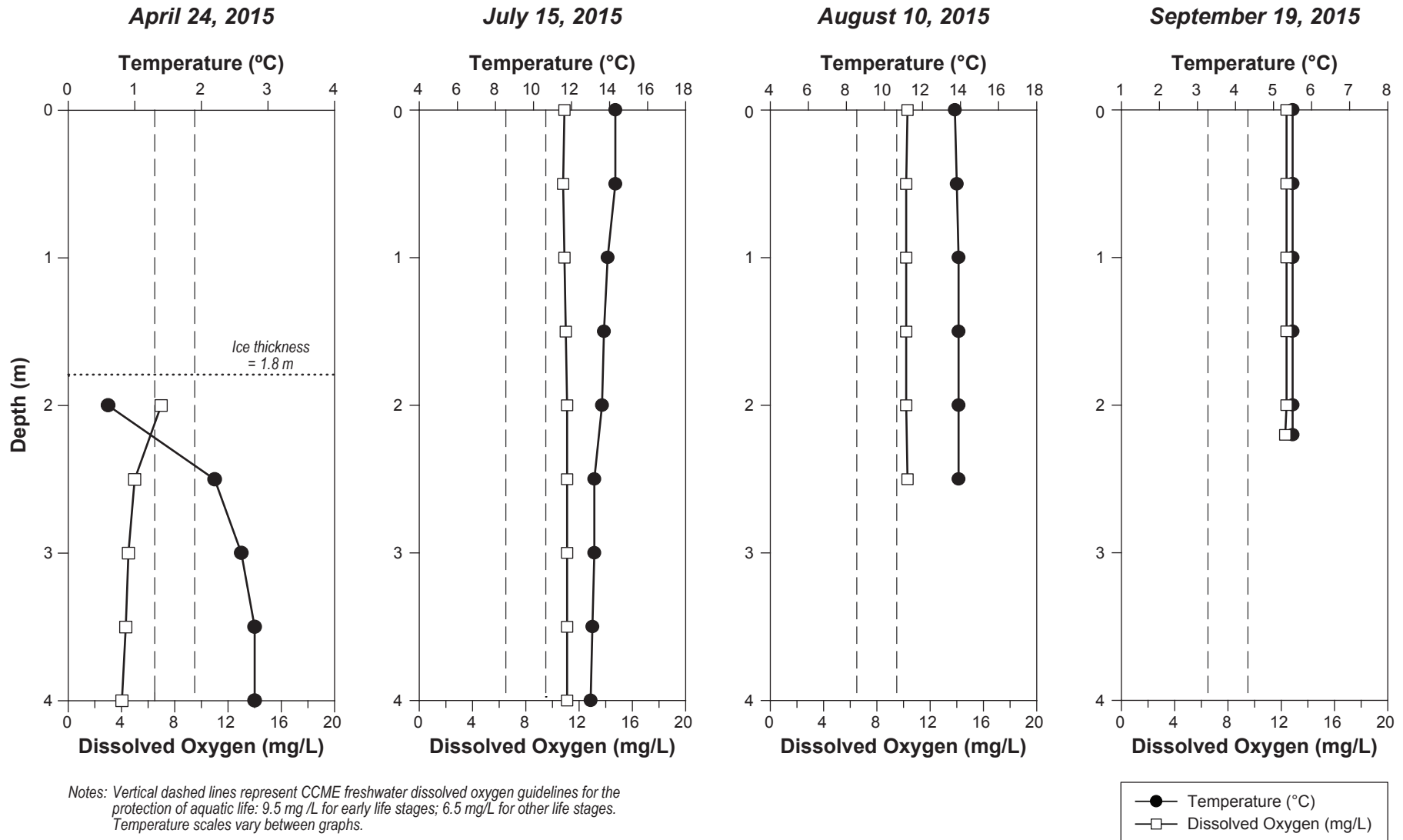


Figure A.2-5

Temperature and Dissolved Oxygen Profiles
in Reference Lake D, Doris North Project, 2015



Annex A.2-1. Temperature and Dissolved Oxygen Profiles, Lake Sites, Doris North Project, 2015

Doris Lake South			
April 25, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
2.0	0.7	14.0	97
2.5	1.4	13.3	95
3.0	1.5	13.2	94
3.5	1.5	13.2	94
4.0	1.5	13.2	95
4.5	1.5	13.3	95
5.0	1.5	13.3	95
5.5	1.5	13.3	95
6.0	1.5	13.2	94
6.5	1.5	13.3	95
7.0	1.5	13.3	95
7.5	1.5	13.3	95
8.0	1.5	13.3	95
8.5	1.5	13.2	94
9.0	1.5	13.2	94
9.5	1.5	13.2	94
10.0	1.6	13.1	94
11.0	1.6	12.3	89

Doris Lake South			
July 18, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	11.2	12.0	110
0.5	11.2	12.0	110
1.0	11.2	12.1	111
1.5	11.2	12.1	111
2.0	11.2	12.1	111
2.5	11.2	12.1	111
3.0	11.2	12.1	111
3.5	11.1	12.1	111
4.0	11.1	12.1	111
4.5	11.1	12.1	110
5.0	11.1	12.1	110
5.5	11.1	12.0	110
6.0	11.1	12.0	110
6.5	11.0	12.0	109
7.0	10.0	11.8	105
7.5	9.6	11.8	103
8.0	8.7	11.8	102
8.5	8.6	11.8	101
9.0	8.0	11.7	99
9.5	7.7	11.6	98
10.0	7.5	11.6	97
10.5	7.4	11.4	96
11.0	7.3	11.0	91

Doris Lake South			
August 5, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	17.0	10.8	112
0.5	16.9	10.9	112
1.0	16.7	10.9	112
1.5	16.5	10.9	111
2.0	16.1	11.1	112
2.5	16.0	11.0	111
3.0	16.0	11.0	111
3.5	15.8	11.0	111
4.0	15.5	10.9	109
4.5	14.0	10.7	104
5.0	11.4	10.5	96
5.5	10.7	10.0	90
6.0	10.2	10.1	90
6.5	10.0	9.9	87
7.0	9.7	9.4	82
7.5	9.4	9.3	81
8.0	9.3	9.2	80
8.5	9.1	8.9	77
9.0	9.0	8.6	74
9.5	9.0	8.6	74
10.0	8.9	8.5	73

Doris Lake South			
September 17, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	6.6	11.7	97
0.5	6.6	11.7	97
1.0	6.6	11.7	96
1.5	6.6	11.7	96
2.0	6.5	11.7	96
2.5	6.5	11.7	96
3.0	6.5	11.7	96
3.5	6.5	11.7	96
4.0	6.5	11.6	96
4.5	6.5	11.7	96
5.0	6.4	11.7	95
5.5	6.4	11.6	95
6.0	6.4	11.6	95
6.5	6.4	11.6	94
7.0	6.4	11.6	95
7.5	6.4	11.6	95
8.0	6.4	11.6	95
8.5	6.4	11.6	95
9.0	6.3	11.5	95
9.5	6.3	11.6	94
10.0	6.3	11.5	94
10.5	6.3	11.4	94

Doris Lake North			
April 25, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
2.0	0.5	13.1	92
2.5	1.3	12.7	90
3.0	1.5	12.6	90
3.5	1.6	12.6	90
4.0	1.6	12.5	90
4.5	1.6	12.5	89
5.0	1.6	12.5	89
5.5	1.6	12.5	89
6.0	1.6	12.5	89
6.5	1.6	12.5	89
7.0	1.6	12.5	89
7.5	1.6	12.4	89
8.0	1.6	12.4	89
8.5	1.6	12.4	89
9.0	1.6	12.4	89
9.5	1.6	12.5	89
10.0	1.6	12.5	89
11.0	1.6	12.1	87
12.0	1.6	8.7	62
13.0	1.6	6.4	46
14.0	1.8	6.0	43

Doris Lake North			
July 18, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	10.1	12.2	109
0.5	10.1	12.2	109
1.0	10.1	12.2	109
1.5	10.1	12.2	109
2.0	10.1	12.2	109
2.5	10.0	12.2	109
3.0	10.0	12.2	109
3.5	10.0	12.2	109
4.0	9.9	12.2	109
4.5	9.9	12.2	109
5.0	9.9	12.2	108
5.5	9.9	12.2	108
6.0	9.9	12.1	108
6.5	9.7	12.1	107
7.0	8.9	11.9	103
7.5	8.4	11.9	102
8.0	7.8	11.6	99
8.5	7.0	11.2	93
9.0	6.7	11.1	91
9.5	6.6	11.1	91
10.0	6.6	11.0	90
10.5	6.5	11.0	90
11.0	6.4	10.8	88
11.5	6.3	10.6	86
12.0	6.1	10.5	85
12.5	6.1	10.5	85
13.0	6.0	10.3	83
13.5	5.9	10.2	83
14.0	5.9	10.1	81

Doris Lake North			
August 5, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	14.9	11.2	110
0.5	14.9	11.2	110
1.0	14.8	11.2	110
1.5	14.8	11.2	110
2.0	14.8	11.2	110
2.5	14.8	11.2	110
3.0	14.8	11.2	110
3.5	14.4	11.2	109
4.0	12.1	11.1	102
4.5	12.0	11.0	102
5.0	11.5	10.9	100
5.5	11.3	10.3	98
6.0	11.0	10.8	98
6.5	10.8	10.7	96
7.0	10.7	10.4	94
7.5	10.4	10.2	91
8.0	10.1	10.0	88
8.5	10.0	9.9	87
9.0	9.7	9.5	83
9.5	9.5	8.9	79
10.0	9.1	8.2	71
11.0	8.6	6.7	56
12.0	8.3	5.4	46
13.0	8.3	5.4	46

Doris Lake North			
September 17, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	6.7	11.7	97
0.5	6.8	11.7	97
1.0	6.8	11.7	97
1.5	6.8	11.7	97
2.0	6.8	11.7	97
2.5	6.8	11.7	97
3.0	6.8	11.7	97
3.5	6.8	11.6	96
4.0	6.8	11.6	96
4.5	6.8	11.6	96
5.0	6.8	11.6	96
5.5	6.8	11.6	96
6.0	6.8	11.6	96
6.5	6.8	11.6	96
7.0	6.8	11.6	96
7.5	6.8	11.6	96
8.0	6.8	11.6	96
8.5	6.8	11.6	95
9.0	6.8	11.6	95
9.5	6.8	11.6	96
10.0	6.8	11.6	96
10.5	6.8	11.6	96
11.0	6.8	11.5	95
11.5	6.8	11.5	95
12.0	6.8	11.5	95
12.5	6.7	11.5	95
13.0	6.7	11.5	95
13.5	6.7	11.5	95
14.0	6.7	11.5	95

Annex A.2-1. Temperature and Dissolved Oxygen Profiles, Lake Sites, Doris North Project, 2015

Reference Lake B			
April 24, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
1.5	0.4	14.2	98
2.0	0.4	14.3	99
2.5	0.8	14.2	100
3.0	1.2	13.7	95
3.5	1.7	12.5	89
4.0	1.8	12.0	86
4.5	2.1	10.0	73
5.0	2.2	9.7	71
5.5	2.4	9.1	66
6.0	2.5	6.8	50
6.5	2.6	6.5	48
7.0	2.6	6.2	45
7.5	2.7	5.3	38
8.0	2.8	4.4	32
8.5	2.9	4.0	30
9.0	3.0	3.2	24
9.5	3.1	2.5	18
10.0	3.2	0.7	5
11.0	3.4	0.3	2

Reference Lake B			
August 11, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	15.6	9.7	100
0.5	15.5	9.7	100
1.0	15.4	9.7	100
1.5	15.2	9.7	100
2.0	15.1	9.8	100
2.5	15.0	9.8	100
3.0	14.9	9.8	100
3.5	14.9	9.8	100
4.0	14.9	9.8	99
4.5	14.9	9.8	99
5.0	14.9	9.7	99
5.5	14.8	9.8	99
6.0	14.8	9.7	99
6.5	14.8	9.7	99
7.0	14.8	9.7	99
7.5	14.8	9.7	99
8.0	14.8	9.7	99
8.5	14.8	9.7	99
9.0	14.8	9.8	100
9.5	14.7	9.8	99

Little Roberts Lake			
April 24, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
2.0	0.2	17.8	123
2.5	1.0	18.1	128
3.0	1.0	18.2	130
3.5	1.6	8.0	58

Little Roberts Lake			
July 15, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	13.0	11.3	108
0.5	13.1	11.3	108
1.0	12.9	11.3	108
1.5	12.5	11.3	108
2.0	12.8	11.3	107
2.5	12.8	11.3	108
3.0	12.7	11.0	105

Little Roberts Lake			
August 10, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	13.1	10.1	97
0.5	13.0	10.2	97
1.0	13.0	10.2	97
1.5	13.0	10.2	97
2.0	13.0	10.2	97

Little Roberts Lake			
September 19, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	6.0	12.3	100
0.5	5.8	12.4	100
1.0	5.8	12.4	100
1.5	5.8	12.4	100
2.0	5.8	12.4	100
2.3	5.7	12.4	100

Reference Lake D			
April 23, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
2.0	0.6	7.0	58
2.5	2.2	5.0	44
3.0	2.6	4.5	40
3.5	2.8	4.3	38
4.0	2.8	4.0	36

Reference Lake D			
July 16, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	14.3	10.9	106
0.5	14.3	10.8	106
1.0	13.9	10.9	106
1.5	13.7	11.0	107
2.0	13.6	11.1	106
2.5	13.2	11.1	106
3.0	13.2	11.1	106
3.5	13.1	11.1	106
4.0	13.0	11.1	105
4.5	11.7	9.9	98

Reference Lake D			
August 9, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	13.7	10.3	99
0.5	13.8	10.2	99
1.0	13.9	10.2	99
1.5	13.9	10.2	99
2.0	13.9	10.2	98
2.5	13.9	10.3	100

Reference Lake D			
September 19, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	5.5	12.4	100
0.5	5.5	12.4	100
1.0	5.5	12.4	100
1.5	5.5	12.4	100
2.0	5.5	12.4	100
2.2	5.5	12.3	99

Reference Lake B			
July 16, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	11.6	11.8	110
0.5	11.6	11.7	109
1.0	11.4	11.8	110
1.5	11.3	11.9	110
2.0	11.3	11.8	110
2.5	10.6	12.0	110
3.0	10.4	12.1	109
3.5	10.2	12.1	109
4.0	10.2	12.1	109
4.5	10.1	12.1	109
5.0	10.0	12.1	109
5.5	10.0	12.1	108
6.0	9.9	12.1	108
6.5	9.7	12.1	108
7.0	9.3	12.2	107
7.5	9.2	12.2	107
8.0	9.1	12.2	107
8.5	9.0	12.2	107
9.0	8.8	12.2	106
9.5	8.7	12.2	106
10.0	8.5	12.2	105
10.5	8.1	12.2	104
11.0	7.9	12.1	104

Reference Lake B			
September 18, 2015			
Depth	Temperature	Dissolved Oxygen	Dissolved Oxygen Saturation
(m)	(°C)	(mg/L)	(%)
0.0	4.7	12.5	99
0.5	4.6	12.5	99
1.0	4.6	12.5	99
1.5	4.6	12.5	99
2.0	4.5	12.5	99
2.5	4.5	12.5	99
3.0	4.5	12.5	99
3.5	4.5	12.5	98
4.0	4.5	12.5	98
4.5	4.5	12.4	98
5.0	4.5	12.4	98
5.5	4.5	12.4	98
6.0	4.5	12.4	98
6.5	4.5	12.4	98
7.0	4.5	12.4	98
7.5	4.5	12.4	98
8.0	4.5	12.4	98
8.5	4.5	12.4	98
9.0	4.5	12.4	98
9.5	4.5	12.3	98
10.0	4.5	12.3	97
10.5	4.5	12.3	97

A.2.3 Marine Data

Marine Secchi depths and calculated euphotic zone depths (1% light level) are shown in Table A.2-3. Figures A.2-6 to A.2-8 show the temperature, dissolved oxygen, and salinity profiles collected at marine sites from April to September 2015; Annexes A.2-2 and A.2-3 provide the profile data in tabular form.

Table A.2-3. Marine Secchi Depths and Euphotic Zone Depths, Doris North Project, 2015

Marine Site	Sampling Date	Secchi Depth (D _s) (m)	Euphotic Zone Depth 1% Light Level (m)
RBW	July 20, 2015	0.75	2.0
	August 6, 2015	4.8	13.0*
	September 15, 2015	0.8	2.2
RBE	July 20, 2015	Bottom (0.75)	-
	August 6, 2015	Bottom (0.5)	-
	September 16, 2015	Bottom (0.5)	-
REF-Marine 1	July 20, 2015	0.9	2.4
	August 8, 2015	4.6	12.4*
	September 16, 2015	4.0	10.8*

Note: * indicates that the euphotic zone extended to the bottom of the water column.

- indicates that the euphotic zone depth was not calculated because the Secchi depth extended to the bottom of the water column.

Figure A.2-6

Temperature, Salinity, and Dissolved Oxygen Profiles
at Marine Site RBW, Doris North Project, 2015

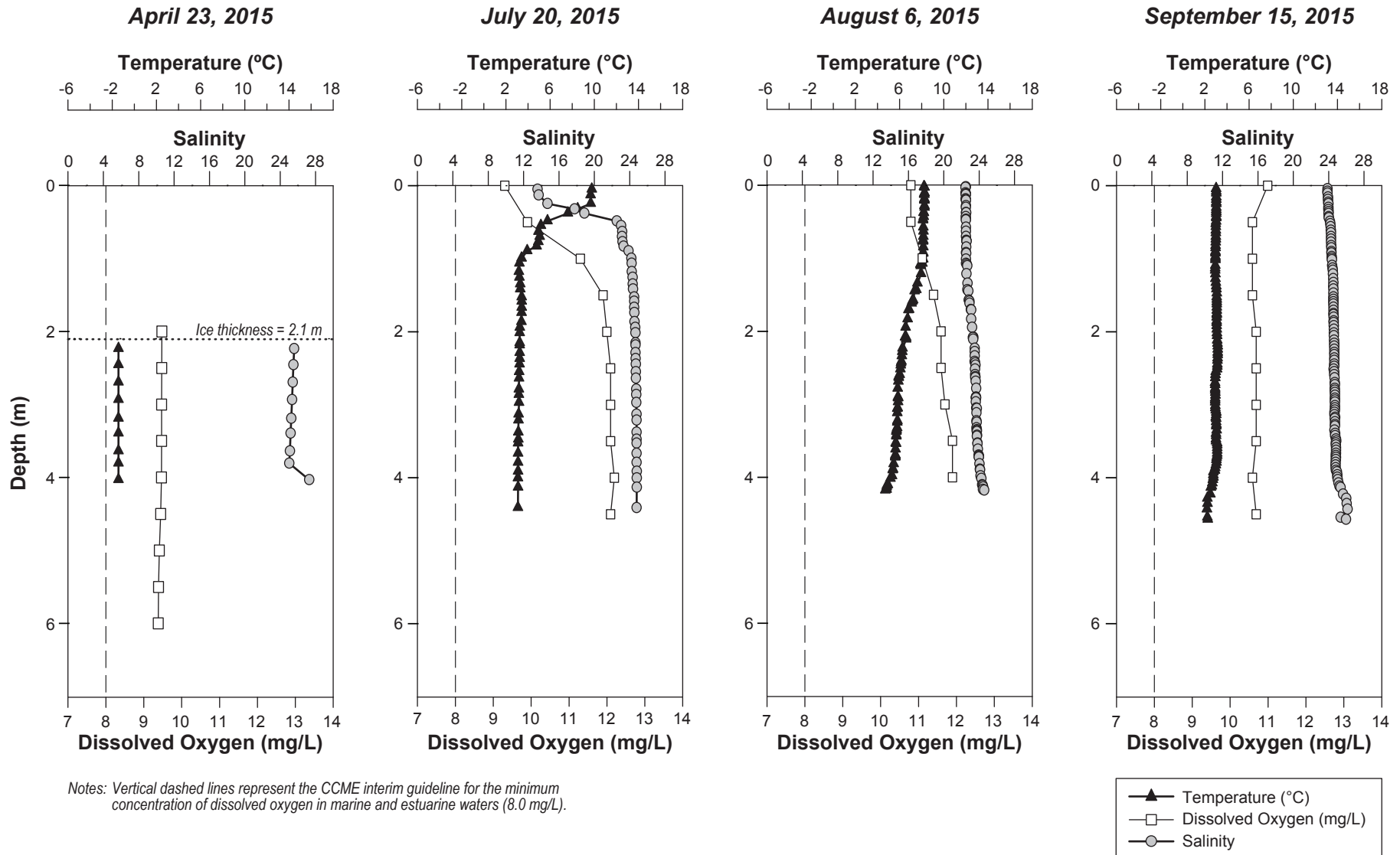


Figure A.2-7

Temperature, Salinity, and Dissolved Oxygen Profiles
at Marine Site RBE, Doris North Project, 2015

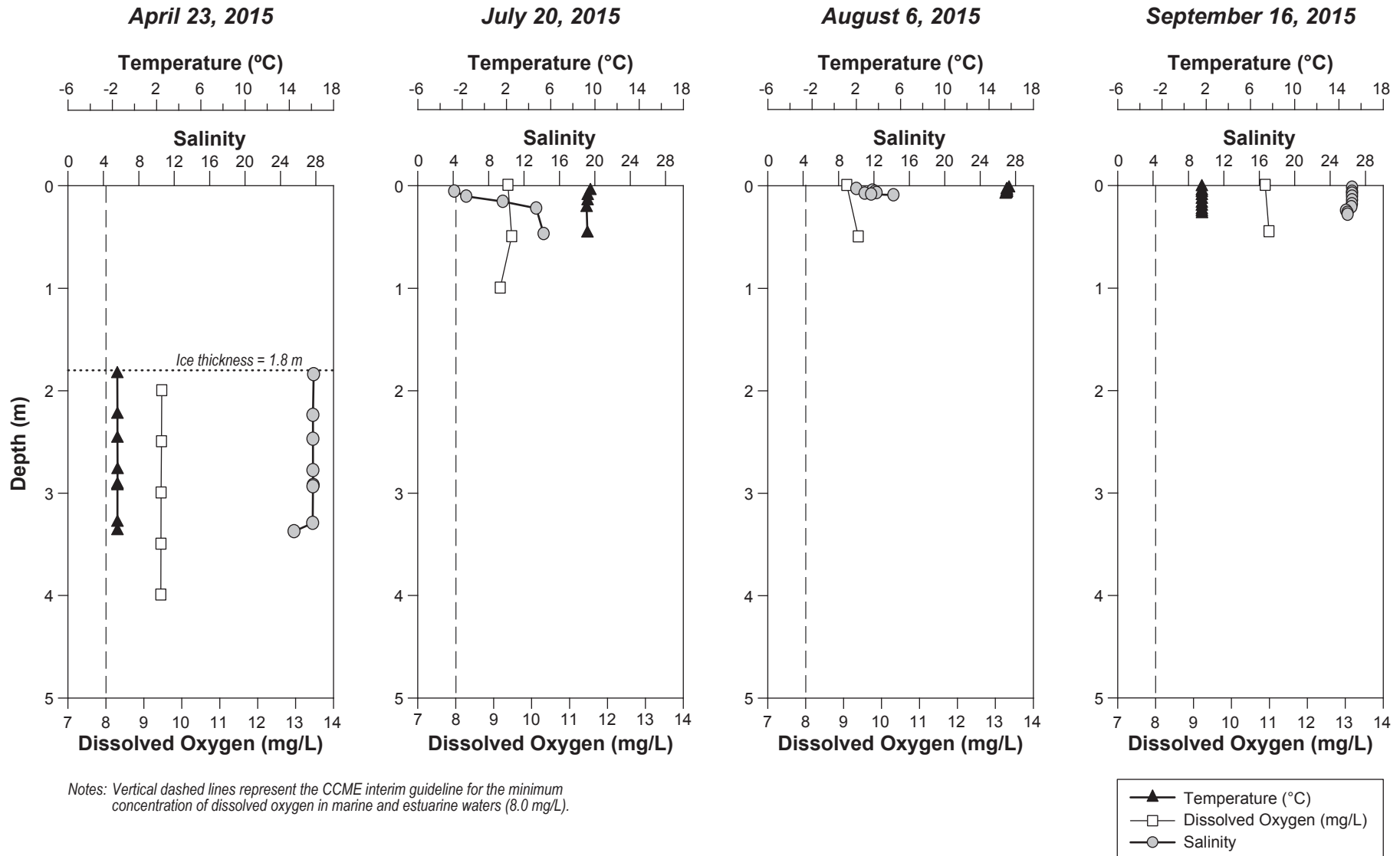
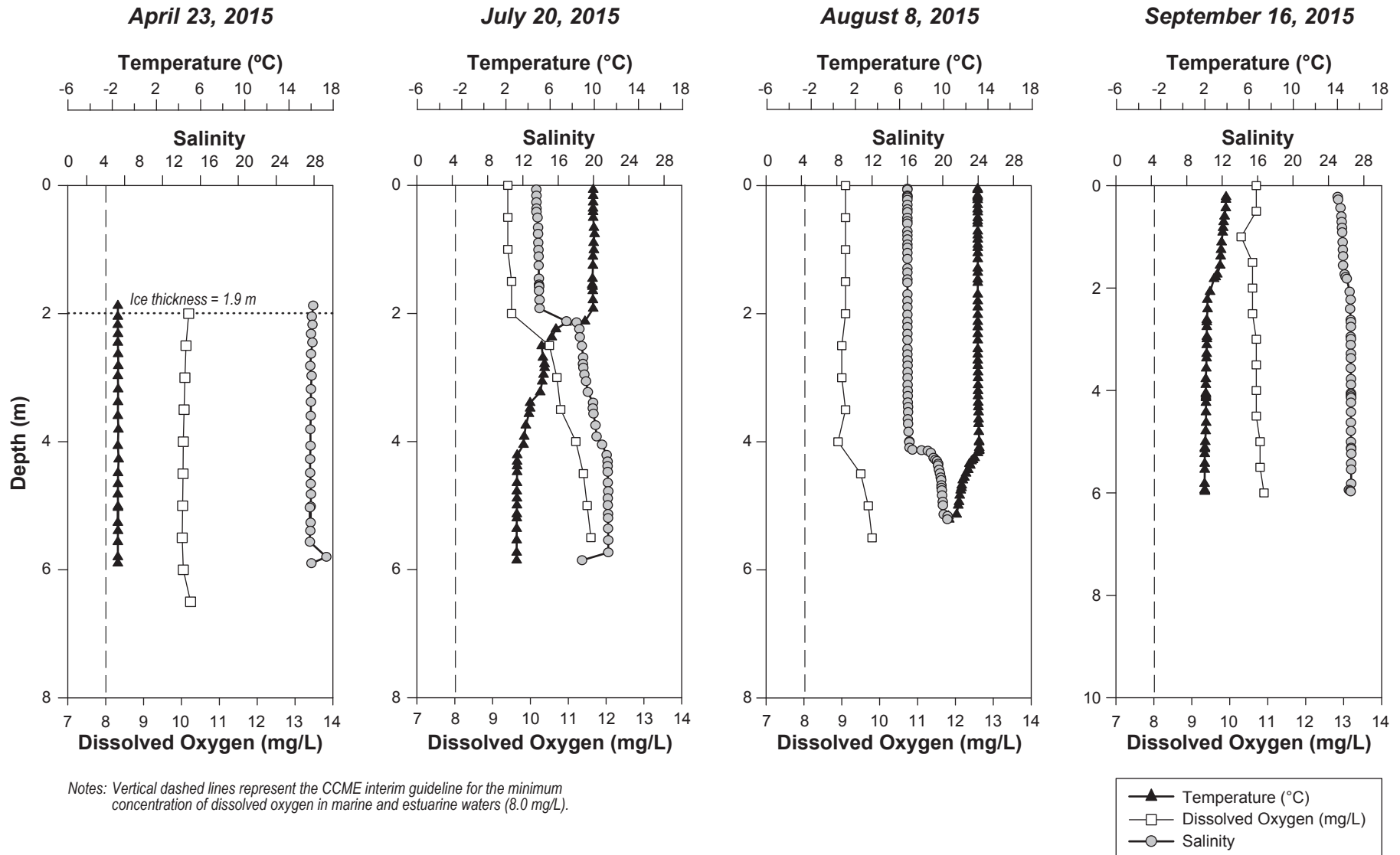


Figure A.2-8

Temperature, Salinity, and Dissolved Oxygen Profiles
at Marine Site REF-Marine 1, Doris North Project, 2015



Annex A.2-2. Temperature and Salinity Profiles, Marine Sites, Doris North Project, 2015

RBW		
April 23, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
2.24	-1.5	25.6
2.46	-1.5	25.5
2.70	-1.5	25.5
2.93	-1.5	25.4
3.19	-1.5	25.3
3.40	-1.5	25.2
3.64	-1.5	25.1
3.81	-1.5	25.1
4.03	-1.5	27.3

RBW		
July 20, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.05	9.8	13.6
0.13	9.7	13.7
0.25	9.7	14.7
0.32	8.5	17.8
0.38	7.6	18.9
0.48	5.8	22.6
0.55	5.2	23.1
0.63	4.9	23.2
0.70	5.1	23.1
0.77	4.9	23.2
0.83	4.8	23.3
0.89	3.9	23.9
1.00	3.4	24.2
1.06	3.2	24.3
1.18	3.2	24.3
1.26	3.2	24.4
1.35	3.3	24.4
1.42	3.3	24.4
1.53	3.4	24.5
1.58	3.4	24.5
1.67	3.4	24.5
1.74	3.4	24.5
1.86	3.4	24.6
1.94	3.2	24.7
2.01	3.2	24.7
2.15	3.2	24.7
2.18	3.2	24.7

RBW		
July 20, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
2.29	3.2	24.7
2.37	3.2	24.7
2.44	3.2	24.7
2.55	3.2	24.7
2.64	3.2	24.7
2.79	3.2	24.8
2.86	3.2	24.8
2.97	3.2	24.8
3.13	3.1	24.8
3.21	3.1	24.8
3.38	3.1	24.8
3.47	3.1	24.8
3.53	3.1	24.8
3.67	3.1	24.8
3.79	3.1	24.8
3.91	3.1	24.8
4.00	3.1	24.8
4.13	3.1	24.8
4.41	3.1	24.8

RBW		
August 6, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.02	8.2	22.5
0.03	8.3	22.5
0.10	8.3	22.5
0.12	8.2	22.5
0.13	8.2	22.5
0.19	8.3	22.5
0.20	8.2	22.5
0.21	8.3	22.5
0.28	8.2	22.5
0.30	8.3	22.5
0.37	8.2	22.5
0.38	8.2	22.6
0.43	8.2	22.5
0.47	8.1	22.5
0.48	8.1	22.5
0.58	8.2	22.5
0.63	8.2	22.5

RBW		
August 6, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.70	8.2	22.5
0.75	8.1	22.6
0.76	8.1	22.6
0.77	8.1	22.6
0.85	8.2	22.6
0.92	8.1	22.5
0.93	8.1	22.6
1.01	8.2	22.5
1.07	8.1	22.5
1.09	7.9	22.6
1.10	7.9	22.7
1.21	8.0	22.6
1.34	7.6	22.7
1.43	7.5	22.7
1.45	7.4	22.8
1.57	7.2	22.8
1.59	7.2	22.9
1.62	7.1	22.9
1.70	6.9	23.1
1.71	6.8	23.1
1.83	6.7	23.1
1.95	6.5	23.2
2.08	6.5	23.4
2.09	6.6	23.3
2.11	6.6	23.3
2.23	6.3	23.5
2.28	6.2	23.5
2.34	6.2	23.5
2.41	6.2	23.5
2.43	6.1	23.6
2.46	6.1	23.6
2.52	6.1	23.6
2.59	6.0	23.6
2.62	5.9	23.6
2.63	5.9	23.6
2.69	5.9	23.6
2.78	5.8	23.7
2.90	5.8	23.7
2.91	5.9	23.7
2.92	5.9	23.7
2.97	5.9	23.7
3.05	5.8	23.7

Annex A.2-2. Temperature and Salinity Profiles, Marine Sites, Doris North Project, 2015

RBW		
August 6, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
3.06	5.8	23.8
3.12	5.8	23.7
3.23	5.8	23.7
3.25	5.8	23.7
3.32	5.8	23.7
3.35	5.7	23.8
3.36	5.7	23.8
3.37	5.7	23.8
3.42	5.7	23.8
3.44	5.7	23.8
3.53	5.6	23.9
3.54	5.7	23.8
3.62	5.6	23.9
3.70	5.6	24.0
3.71	5.6	24.0
3.72	5.6	24.0
3.73	5.6	24.0
3.82	5.5	24.1
3.89	5.4	24.1
3.90	5.4	24.1
3.98	5.3	24.2
4.02	5.2	24.3
4.10	4.9	24.4
4.11	4.9	24.4
4.13	4.8	24.5
4.17	4.8	24.5
4.18	4.7	24.6

RBW		
September 15, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.04	3.1	23.9
0.08	3.1	23.9
0.10	3.1	23.9
0.16	3.1	24.0
0.19	3.1	24.0
0.23	3.1	24.0
0.25	3.1	24.0
0.30	3.1	24.0
0.33	3.1	24.0

RBW		
September 15, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.36	3.1	24.0
0.38	3.1	24.0
0.42	3.1	24.0
0.44	3.1	24.1
0.49	3.1	24.2
0.52	3.0	24.2
0.56	3.0	24.3
0.61	3.0	24.3
0.65	3.0	24.3
0.70	3.0	24.3
0.73	3.0	24.3
0.77	3.0	24.3
0.82	3.0	24.3
0.85	3.0	24.3
0.90	3.0	24.3
0.92	3.0	24.4
0.97	3.0	24.4
1.00	3.0	24.4
1.01	3.0	24.4
1.09	3.0	24.4
1.13	3.0	24.5
1.16	3.0	24.5
1.21	3.0	24.5
1.27	3.0	24.5
1.33	3.0	24.6
1.38	3.1	24.6
1.42	3.1	24.6
1.47	3.1	24.6
1.53	3.1	24.6
1.56	3.1	24.6
1.59	3.1	24.6
1.62	3.1	24.6
1.67	3.1	24.6
1.71	3.1	24.6
1.75	3.1	24.6
1.77	3.1	24.6
1.80	3.1	24.6
1.85	3.1	24.6
1.88	3.1	24.6
1.92	3.1	24.6
1.97	3.1	24.6
2.02	3.1	24.6

RBW		
September 15, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
2.06	3.1	24.6
2.12	3.2	24.6
2.16	3.2	24.7
2.20	3.2	24.7
2.24	3.2	24.7
2.28	3.2	24.7
2.32	3.2	24.7
2.36	3.2	24.7
2.39	3.2	24.7
2.44	3.2	24.7
2.48	3.2	24.7
2.51	3.2	24.6
2.55	3.0	24.7
2.59	3.0	24.7
2.63	3.0	24.7
2.70	3.0	24.7
2.73	3.0	24.7
2.78	3.0	24.7
2.80	3.0	24.7
2.83	3.0	24.7
2.87	3.0	24.7
2.91	3.0	24.7
2.94	3.0	24.7
2.97	3.0	24.7
3.01	3.0	24.8
3.04	3.0	24.8
3.07	3.0	24.7
3.11	3.1	24.7
3.14	3.1	24.7
3.17	3.0	24.8
3.19	3.1	24.7
3.23	3.1	24.8
3.27	3.1	24.8
3.29	3.1	24.8
3.35	3.1	24.7
3.39	3.0	24.8
3.43	3.1	24.8
3.47	3.1	24.9
3.50	3.1	24.9
3.53	3.1	24.8
3.55	3.2	24.8
3.59	3.2	24.9

Annex A.2-2. Temperature and Salinity Profiles, Marine Sites, Doris North Project, 2015

RBW		
September 15, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
3.63	3.2	24.9
3.67	3.2	24.9
3.70	3.2	24.8
3.72	3.1	24.9
3.75	3.1	24.8
3.79	3.1	24.8
3.83	3.0	24.8
3.87	3.0	24.8
3.90	3.0	24.9
3.92	2.8	25.0
3.96	2.8	25.0
3.99	2.8	25.0
4.03	2.8	25.1
4.07	2.7	25.1
4.12	2.7	25.3
4.13	2.6	25.4
4.22	2.5	25.7
4.28	2.3	26.0
4.36	2.3	26.1
4.43	2.2	26.2
4.54	2.3	25.4
4.57	2.3	26.0

RBE		
April 23, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
1.85	-1.5	27.7
2.24	-1.5	27.7
2.48	-1.5	27.7
2.78	-1.5	27.7
2.93	-1.5	27.7
2.94	-1.5	27.7
3.30	-1.5	27.6
3.38	-1.5	25.5

RBE		
July 20, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.06	9.7	4.2
0.11	9.5	5.6
0.16	9.4	9.7
0.23	9.4	13.5
0.48	9.4	14.3

RBE		
August 6, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.04	15.9	10.1
0.05	15.7	11.9
0.06	15.7	12.2
0.07	15.6	12.4
0.08	15.7	11.0
0.09	15.6	11.7
0.10	15.6	14.3

RBE		
September 16, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.02	1.6	26.6
0.06	1.6	26.6
0.08	1.6	26.6
0.11	1.6	26.6
0.15	1.6	26.6
0.19	1.6	26.6
0.22	1.6	26.5
0.25	1.6	25.9
0.27	1.6	26.0
0.29	1.6	26.1

REF-Marine 1		
April 23, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
1.87	-1.5	27.9
2.04	-1.5	27.8
2.17	-1.5	27.8
2.32	-1.5	27.7
2.45	-1.5	27.8
2.63	-1.5	27.7
2.82	-1.4	27.6
2.97	-1.5	27.7
3.18	-1.4	27.7
3.38	-1.5	27.7
3.59	-1.5	27.7
3.81	-1.4	27.6
4.06	-1.5	27.6
4.27	-1.4	27.6
4.49	-1.5	27.6
4.66	-1.5	27.7
4.82	-1.5	27.7
5.01	-1.5	27.7
5.27	-1.5	27.7
5.39	-1.5	27.6
5.03	-1.5	27.6
5.57	-1.5	27.6
5.80	-1.5	29.3
5.90	-1.5	27.7

REF-Marine 1		
July 20, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.06	10.0	13.5
0.16	10.0	13.5
0.26	10.0	13.5
0.36	10.0	13.5
0.41	10.0	13.5
0.50	10.0	13.7
0.66	10.0	13.7
0.76	10.1	13.7
0.90	10.0	13.8
1.01	10.0	13.8
1.11	9.9	13.8
1.25	9.9	13.8

Annex A.2-2. Temperature and Salinity Profiles, Marine Sites, Doris North Project, 2015

REF-Marine 1		
July 20, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
1.45	9.9	13.8
1.55	9.9	13.8
1.57	9.9	13.8
1.58	9.9	13.8
1.65	9.9	13.8
1.79	10.0	13.9
1.92	10.0	13.9
2.12	9.2	16.9
2.14	7.6	18.1
2.24	6.6	18.4
2.37	6.2	18.5
2.51	5.3	18.7
2.69	5.4	18.8
2.79	5.6	18.8
2.85	5.6	18.9
2.95	5.5	19.0
3.06	5.4	19.2
3.23	5.2	19.4
3.39	4.3	19.9
3.48	4.3	19.9
3.57	4.1	20.0
3.75	3.9	20.2
3.92	3.7	20.3
4.05	3.7	21.0
4.21	3.1	21.5
4.31	3.1	21.6
4.38	3.1	21.6
4.47	3.1	21.6
4.64	3.1	21.6
4.78	3.0	21.7
4.89	3.1	21.6
4.99	3.1	21.6
5.13	3.1	21.7
5.20	3.0	21.7
5.36	3.0	21.7
5.54	3.0	21.7
5.73	3.0	21.7
5.85	3.0	18.7

REF-Marine 1		
August 8, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.05	13.2	16.0
0.07	13.2	16.0
0.16	13.2	16.0
0.17	13.2	16.0
0.19	13.2	16.0
0.22	13.2	16.0
0.30	13.2	16.0
0.37	13.2	16.0
0.41	13.2	16.0
0.50	13.2	16.0
0.56	13.2	16.0
0.59	13.2	16.0
0.71	13.2	16.0
0.78	13.2	16.0
0.84	13.2	16.0
0.92	13.2	16.0
0.97	13.2	16.0
1.05	13.2	16.0
1.15	13.2	16.0
1.29	13.2	16.0
1.36	13.2	16.0
1.46	13.2	16.0
1.52	13.2	16.0
1.70	13.2	16.0
1.80	13.2	16.0
1.90	13.2	16.0
2.02	13.2	16.0
2.13	13.2	16.0
2.21	13.2	16.0
2.31	13.2	16.0
2.41	13.2	16.0
2.55	13.2	16.0
2.63	13.2	16.0
2.73	13.2	16.0
2.81	13.2	16.0
2.91	13.2	16.0
3.00	13.2	16.0
3.11	13.2	16.0
3.20	13.2	16.0
3.28	13.2	16.0
3.38	13.2	16.0
3.46	13.2	16.1

REF-Marine 1		
August 8, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
3.54	13.2	16.1
3.65	13.2	16.0
3.72	13.2	16.1
3.84	13.3	16.1
3.99	13.3	16.2
4.00	13.3	16.2
4.09	13.3	16.2
4.13	13.3	16.6
4.13	13.3	17.6
4.14	13.3	18.3
4.18	13.2	18.6
4.25	12.9	19.0
4.28	12.7	19.2
4.30	12.6	19.3
4.34	12.4	19.5
4.37	12.5	19.5
4.44	12.3	19.6
4.49	12.1	19.7
4.56	12.0	19.8
4.60	11.8	19.8
4.68	11.7	19.9
4.72	11.7	19.9
4.76	11.6	19.9
4.84	11.5	19.9
4.94	11.5	20.0
5.00	11.4	20.0
5.13	11.3	20.1
5.16	10.5	20.6
5.21	10.6	20.5

REF-Marine 1		
September 16, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
0.22	3.9	25.0
0.27	3.9	25.1
0.44	3.9	25.4
0.60	3.8	25.5
0.71	3.7	25.5
0.82	3.7	25.5
0.91	3.6	25.6

Annex A.2-2. Temperature and Salinity Profiles, Marine Sites, Doris North Project, 2015

REF-Marine 1		
September 16, 2015		
Depth	Temperature	
(m)	(°C)	Salinity
1.10	3.5	25.6
1.25	3.5	25.6
1.38	3.5	25.7
1.56	3.4	25.6
1.73	3.2	25.8
1.78	3.0	25.9
1.82	2.9	26.1
2.07	2.5	26.4
2.23	2.3	26.5
2.41	2.3	26.4
2.62	2.2	26.5
2.66	2.2	26.5
2.76	2.2	26.5
2.95	2.2	26.5
2.99	2.2	26.5
3.11	2.2	26.5
3.28	2.2	26.5
3.37	2.2	26.5
3.57	2.2	26.5
3.77	2.1	26.5
3.89	2.1	26.5
4.05	2.1	26.5
4.08	2.1	26.5
4.11	2.1	26.6
4.14	2.1	26.6
4.24	2.1	26.6
4.42	2.1	26.5
4.63	2.2	26.5
4.79	2.1	26.6
5.00	2.1	26.5
5.12	2.0	26.6
5.14	2.0	26.6
5.24	2.0	26.6
5.43	2.0	26.6
5.55	2.0	26.6
5.82	2.0	26.6
5.94	2.0	26.3
5.96	2.0	26.5
5.98	2.0	26.5

Annex A.2-3. Dissolved Oxygen Profiles, Marine Sites, Doris North Project, 2015

RBW		
April 23, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
2.0	10.6	84
2.5	10.6	84
3.0	10.5	84
3.5	10.5	84
4.0	10.5	84
4.5	10.4	83
5.0	10.3	82
5.5	10.2	81
6.0	10.2	81

RBW		
July 20, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
0.0	9.3	100
0.5	9.9	104
1.0	11.3	109
1.5	11.9	109
2.0	12.0	110
2.5	12.1	110
3.0	12.1	110
3.5	12.1	110
4.0	12.2	110
4.5	12.1	110

RBW		
August 6, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
0.0	10.8	112
0.5	10.8	112
1.0	11.1	112
1.5	11.4	113
2.0	11.6	113
2.5	11.6	113
3.0	11.7	112
3.5	11.9	111
4.0	11.9	108

RBW		
September 15, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
0.0	11.0	100
0.5	10.6	96
1.0	10.6	95
1.5	10.6	95
2.0	10.7	96
2.5	10.7	96
3.0	10.7	96
3.5	10.7	96
4.0	10.6	95
4.5	10.7	95

RBE		
April 23, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
2.0	10.6	85
2.5	10.6	84
3.0	10.6	84
3.5	10.5	84
4.0	10.5	84

RBE		
July 20, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
0.0	9.4	99
0.5	9.5	100
1.0	9.2	97

RBE		
August 6, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
0.0	9.1	109
0.5	9.4	110

RBE		
September 16, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
0.0	10.9	95
0.5	11.0	96

REF-Marine 1		
April 23, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
2.0	10.2	81
2.5	10.1	80
3.0	10.1	80
3.5	10.1	80
4.0	10.1	80
4.5	10.0	80
5.0	10.0	80
5.5	10.0	80
6.0	10.1	80
6.5	10.2	82

REF-Marine 1		
July 20, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
0.0	9.4	100
0.5	9.4	100
1.0	9.4	100
1.5	9.5	100
2.0	9.5	101
2.5	10.5	104
3.0	10.7	104
3.5	10.8	103
4.0	11.2	103
4.5	11.4	104
5.0	11.5	105
5.5	11.6	105

REF-Marine 1		
August 8, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
0.0	9.1	102
0.5	9.1	102
1.0	9.1	102
1.5	9.1	102
2.0	9.1	102
2.5	9.0	102
3.0	9.0	101
3.5	9.1	102
4.0	8.9	100
4.5	9.5	105
5.0	9.7	106
5.5	9.8	106

REF-Marine 1		
September 16, 2015		
Depth (m)	Dissolved Oxygen (mg/L)	Dissolved Oxygen Saturation (%)
0.0	10.7	99
0.5	10.7	99
1.0	10.3	95
1.5	10.6	97
2.0	10.6	96
2.5	10.6	95
3.0	10.7	95
3.5	10.7	94
4.0	10.7	95
4.5	10.7	95
5.0	10.8	95
5.5	10.8	95
6.0	10.9	96

A.3 2015 WATER QUALITY

The following sections present the water quality data collected from April to September 2015 from stream, lake, and marine sites, as well as the QA/QC water quality data. Only the variables that were subjected to an evaluation of effects (see main body of the report) are shown graphically. All water quality variables were screened against CCME water quality guidelines for the protection of aquatic life (CCME 2015b). CCME guidelines are included in all graphs and annexes.

A.3.1 Stream Data

Stream water quality data were collected monthly from June to September 2015. Figures A.3-1 to A.3-9 show monthly trends of select water quality variables. Annex A.3-1 presents the full 2015 stream water quality dataset.

A.3.2 Lake Data

Lake water quality data were collected in April (under-ice sampling) and monthly from July to September 2015. Figures A.3-10 to A.3-18 show seasonal trends for select water quality variables. Annex A.3-2 presents the full 2015 lake water quality dataset.

A.3.3 Marine Data

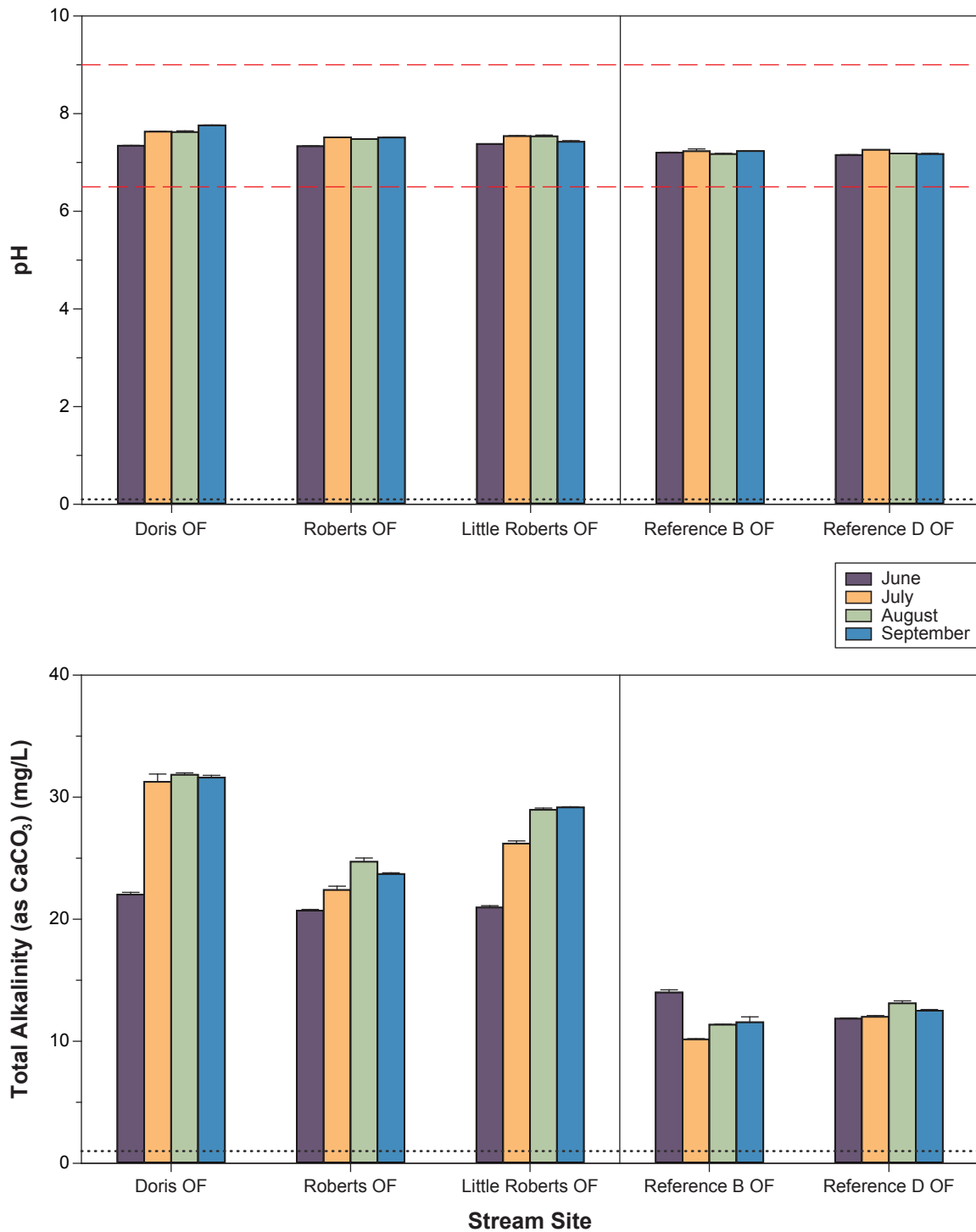
Marine water quality data were collected in April (under-ice sampling) and monthly from July to September 2015. Figures A.3-19 to A.3-27 show seasonal trends for select water quality variables. Annex A.3-3 presents the full 2015 marine water quality dataset.

A.3.4 Quality Assurance/Quality Control (QA/QC) Data

Annex A.3-4 presents the results of the QA/QC blank data (equipment, field, and travel blanks) collected to identify possible sources of contamination to water quality samples. A subset of blanks contained values above detection limits for select nutrients and metals; however, there was no obvious contamination of water quality samples that can be attributed to sampling equipment, sample collection, or sample transportation.

Figure A.3-1

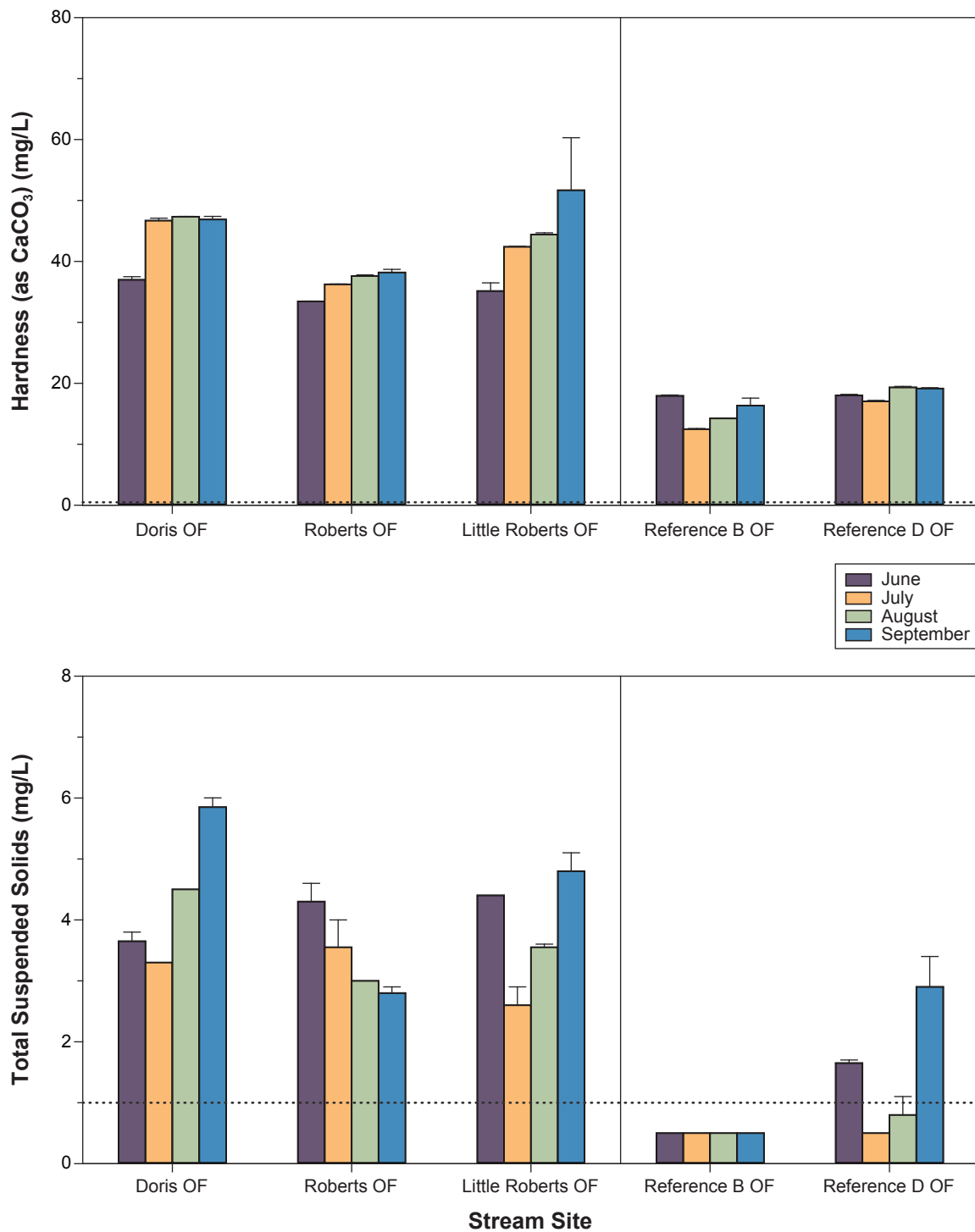
pH and Total Alkalinity in Stream Sites,
Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits.
 Red dashed lines represent the CCME freshwater guideline pH range (6.5–9.0).
 pH is a required parameter for water quality monitoring as per Schedule 5, s. 7(1)(c) of the MMR.
 Total alkalinity is a required parameter for effluent characterization and water quality monitoring as per Schedule 5, s. 4(1) and s. 7(1)(c) of the MMR.

Figure A.3-2

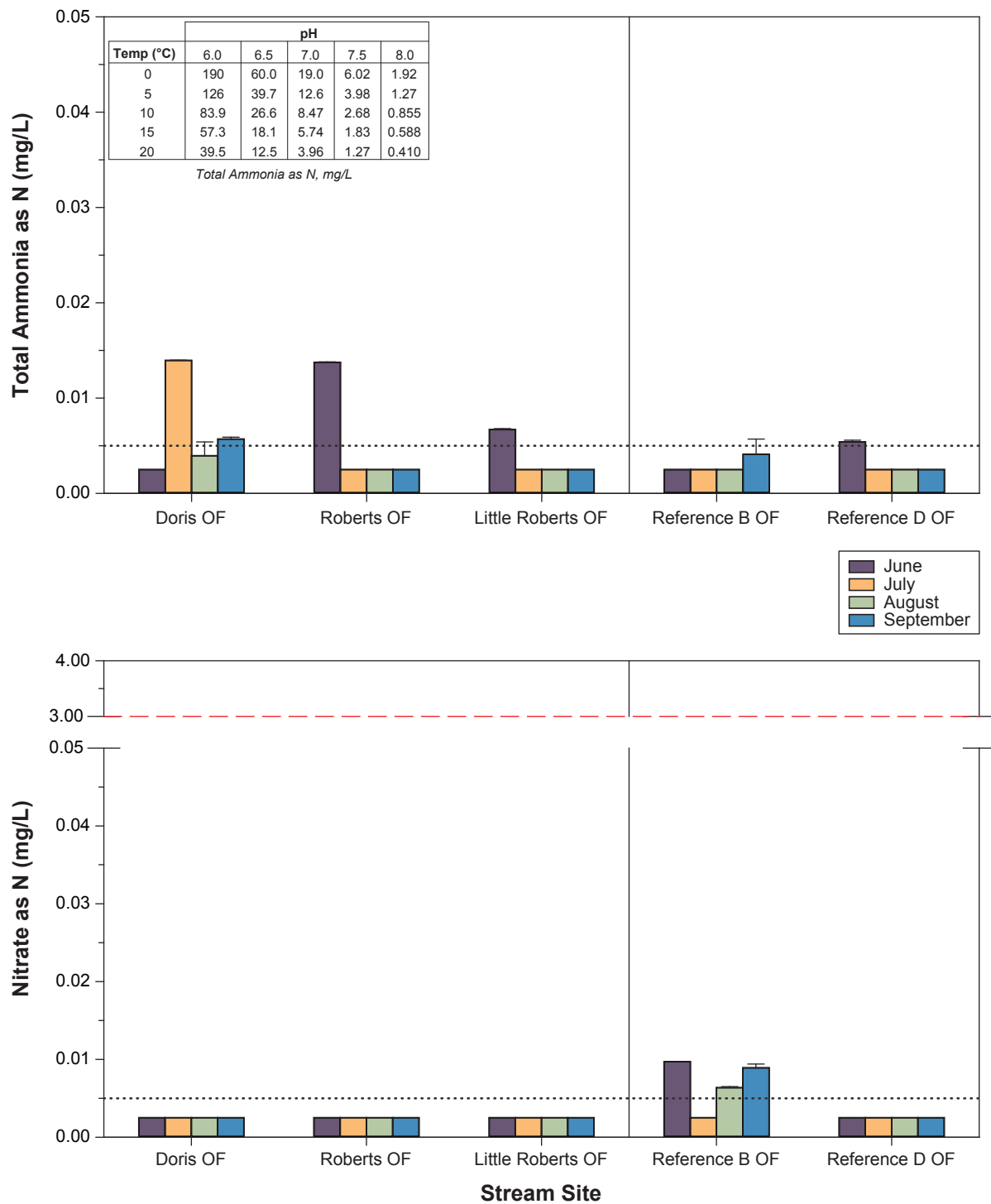
Hardness and Total Suspended Solids in Stream Sites,
Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 The CCME freshwater guideline for total suspended solids is dependent upon background levels.
 Hardness is a required parameter for effluent characterization and water quality monitoring as per Schedule 5, s. 4(1) and s. 7(1)(c) of the MMER.
 Total suspended solids are regulated as deleterious substances in effluents as per Schedule 4 of the MMER.

Figure A.3-3

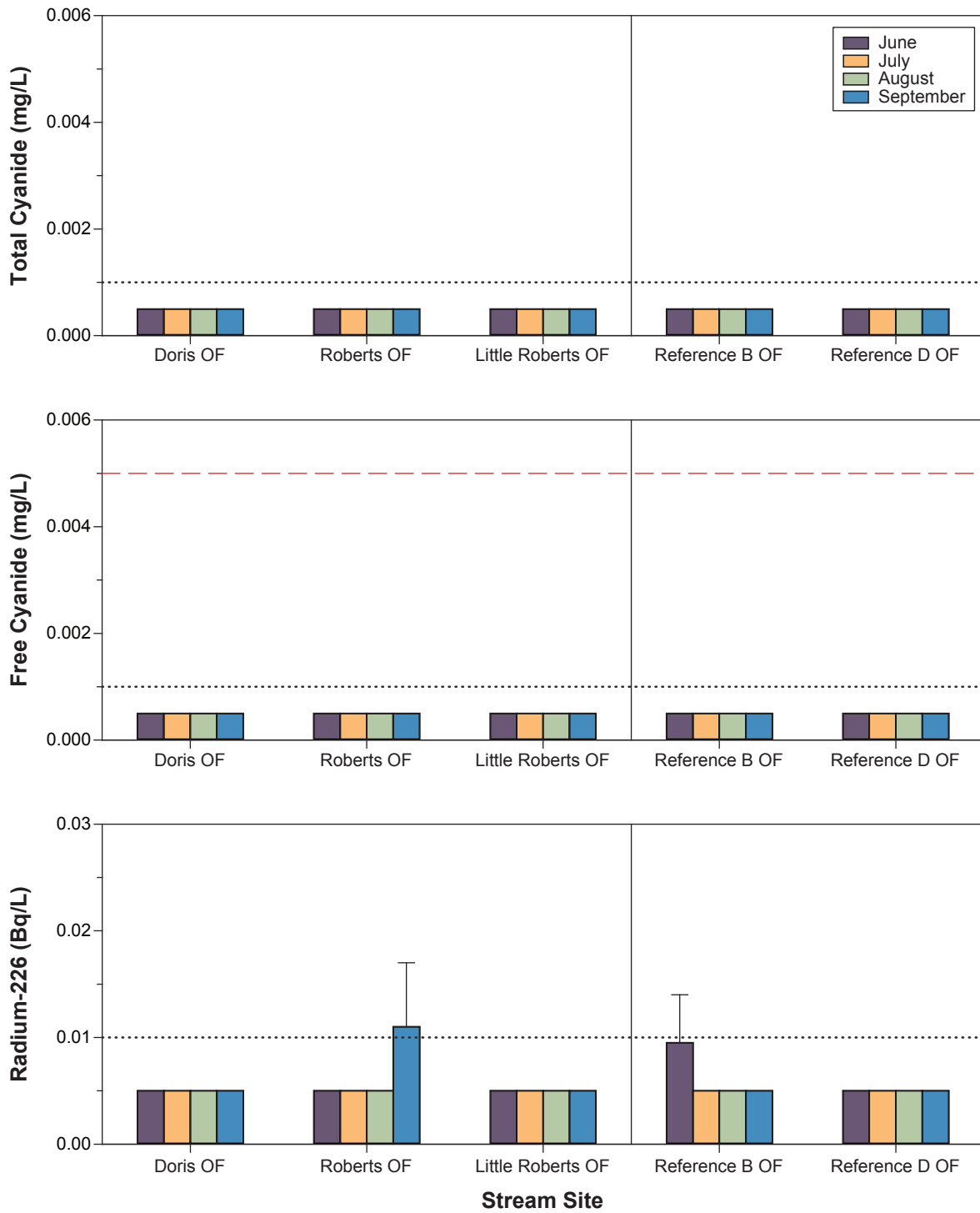
Total Ammonia and Nitrate Concentrations in Stream Sites,
Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Inset table shows the pH- and temperature-dependent CCME freshwater guideline for total ammonia.
 Red dashed line represents the CCME freshwater guideline for nitrate as N (3.0 mg/L; long-term concentration).
 Total ammonia and nitrate are required parameters for effluent characterization as per Schedule 5, s. 4(1) of the MMER.

Figure A.3-4

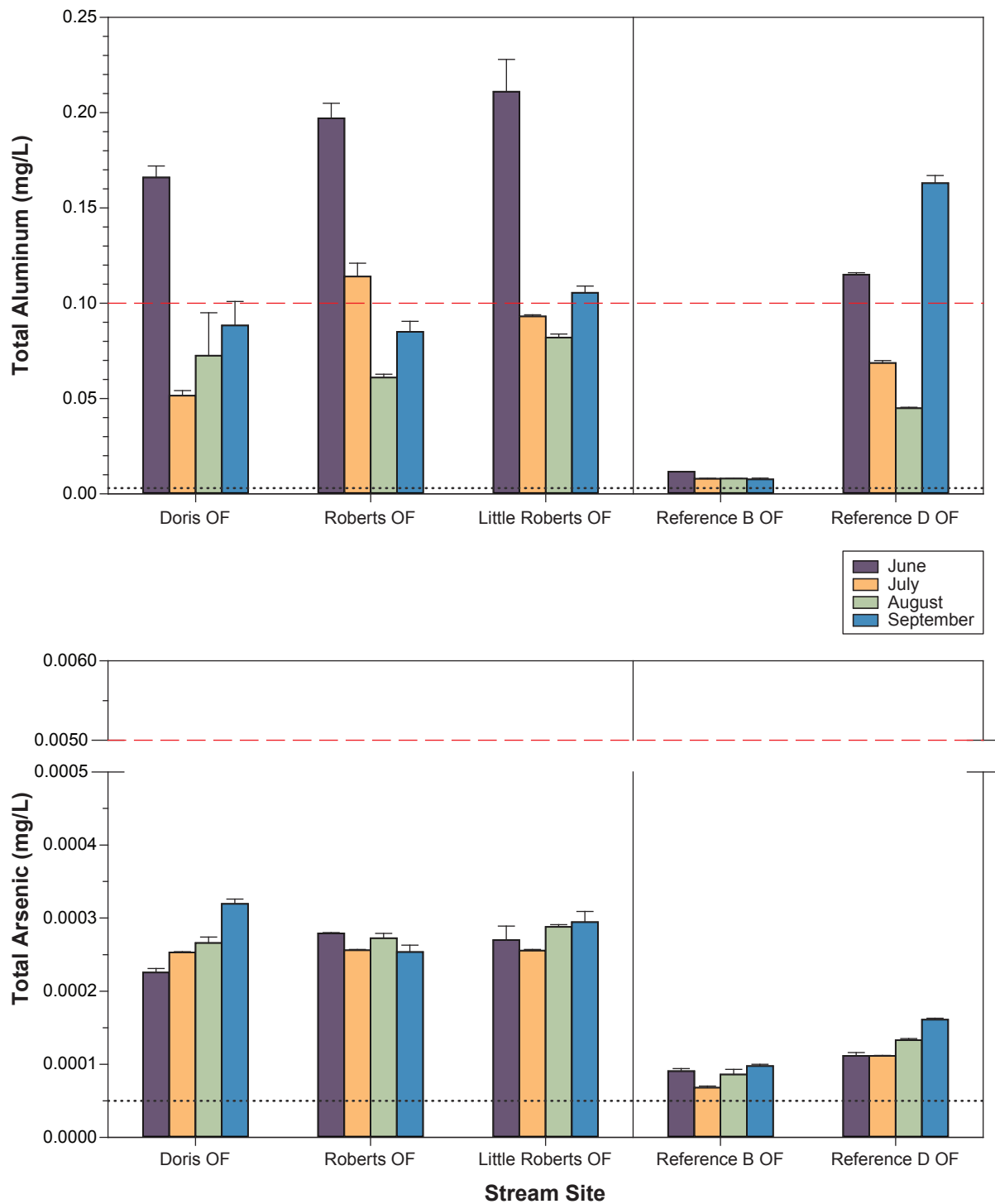
**Total Cyanide, Free Cyanide, and Radium-226
Concentrations in Stream Sites, Doris North Project, 2015**



Notes: Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 All total cyanide and free cyanide concentrations in stream samples were below the detection limit.
 Red dashed line represents the CCME freshwater guideline for free cyanide (0.005 mg/L).
 Total cyanide and radium-226 are regulated as deleterious substances in effluents as per Schedule 4 of the MMER.

Figure A.3-5

**Total Aluminum and Total Arsenic Concentrations
in Stream Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.

Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit. Red dashed lines represent the pH-dependent CCME freshwater guideline for aluminum (0.005 mg/L at pH < 6.5; 0.1 mg/L at pH ≥ 6.5) and the CCME freshwater guideline for arsenic (0.005 mg/L).

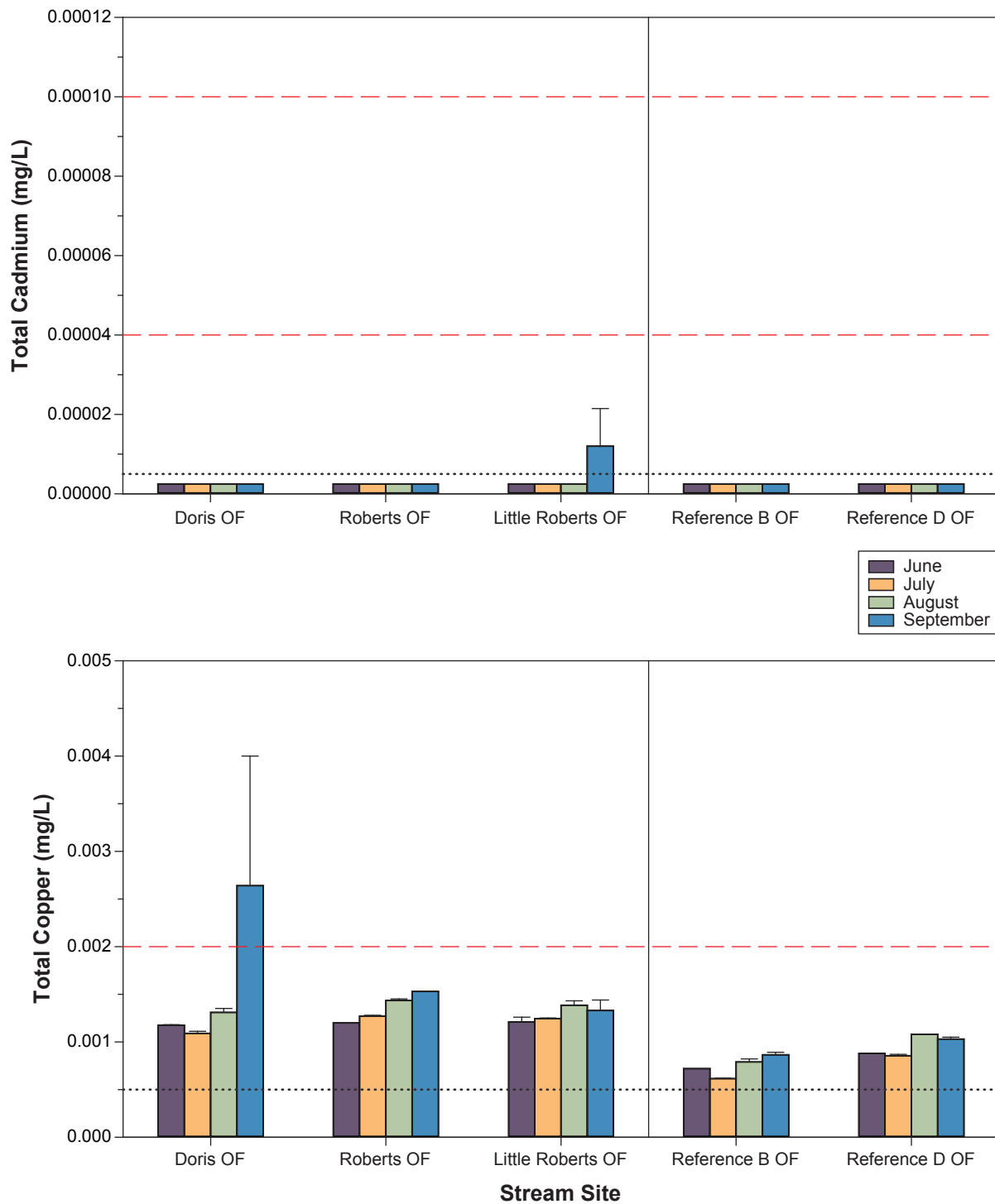
pH was greater than 6.5 in all stream samples.

Total aluminum is a required parameter for effluent characterization as per Schedule 5, s. 4(1) of the MMER.

Total arsenic is regulated as a deleterious substance in effluents as per Schedule 4 of the MMER.

Figure A.3-6

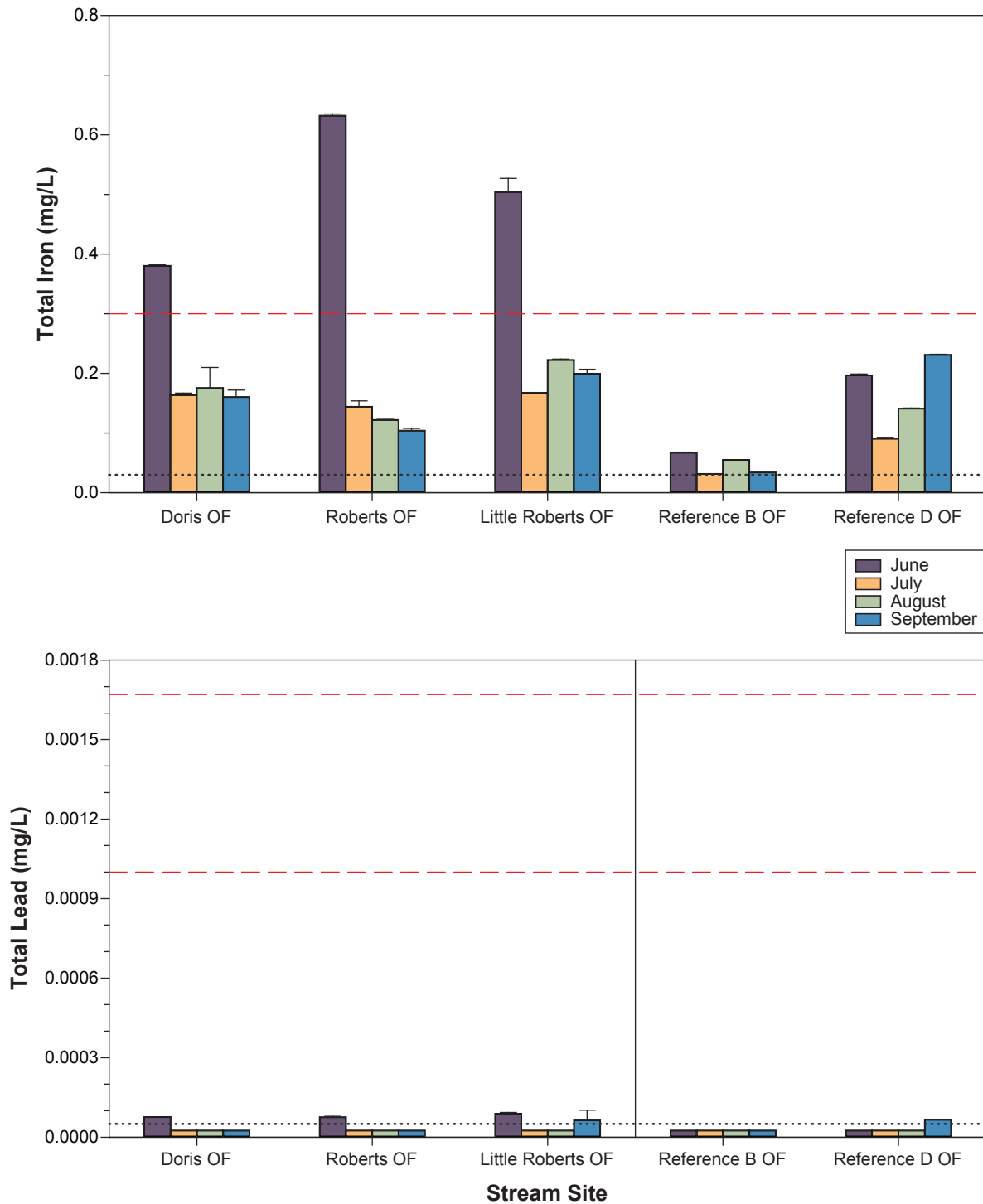
**Total Cadmium and Total Copper Concentrations
in Stream Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 The CCME freshwater guidelines for cadmium and copper are hardness dependent.
 Red dashed lines represent the minimum and maximum site-specific CCME freshwater guidelines for cadmium (0.00004 and 0.00010 mg/L) and for copper (0.002 mg/L) based on the hardness (as CaCO₃) range in streams of 12.4 to 60.3 mg/L.
 Total cadmium is a required parameter for effluent characterization as per Schedule 5, s. 4(1) of the MMER.
 Total copper is regulated as a deleterious substance in effluents as per Schedule 4 of the MMER.

Figure A.3-7

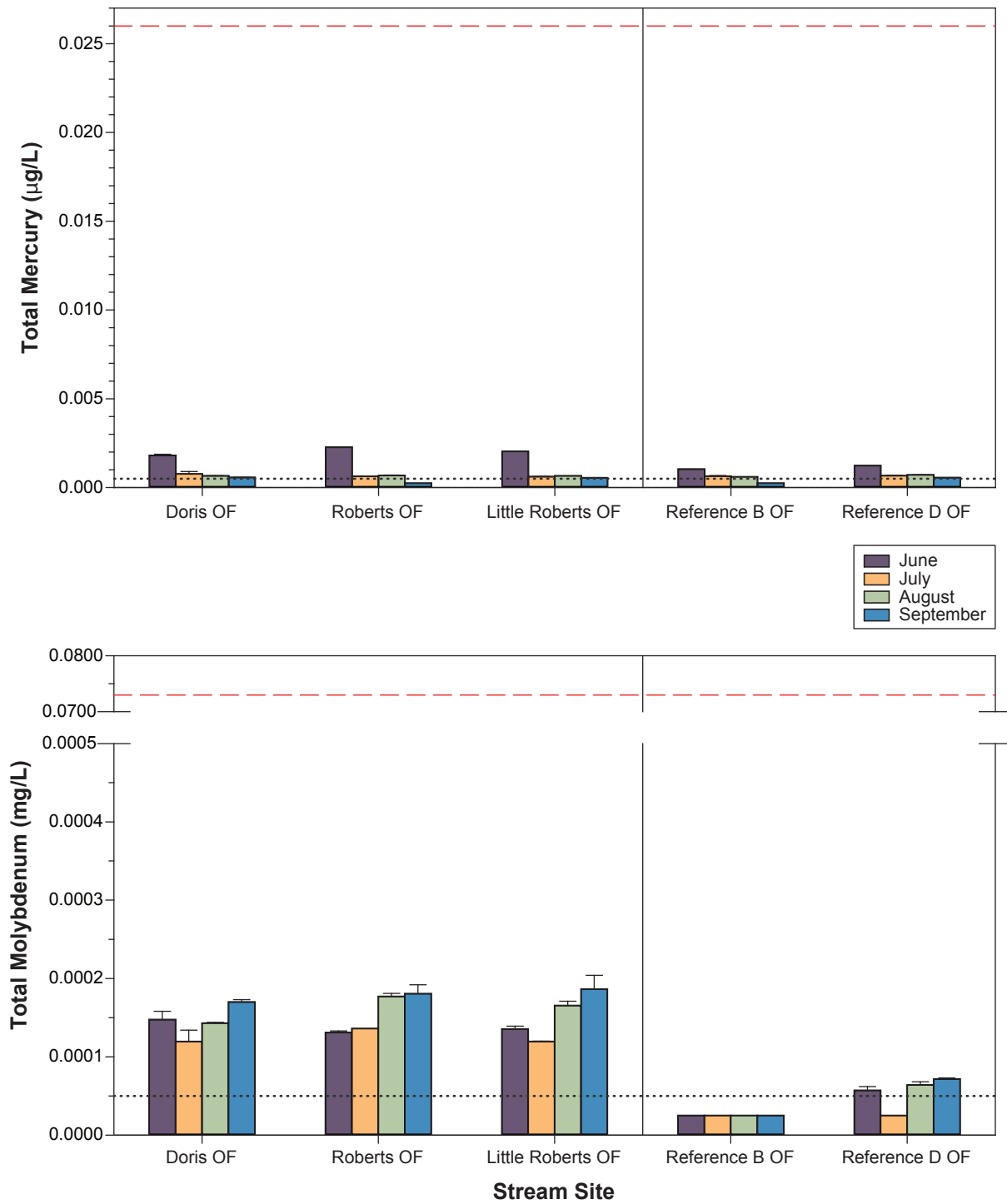
**Total Iron and Total Lead Concentrations
in Stream Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 The CCME freshwater guideline for lead is hardness dependent.
 Red dashed lines represent the CCME freshwater guideline for iron (0.3 mg/L) and the minimum and maximum site-specific CCME freshwater guidelines for lead (0.001 and 0.00167 mg/L) based on the hardness (as CaCO₃) range in streams of 12.4 to 60.3 mg/L.
 Total iron is a required parameter for effluent characterization as per Schedule 5, s. 4(1) of the MMER.
 Total lead is regulated as a deleterious substance in effluents as per Schedule 4 of the MMER.

Figure A.3-8

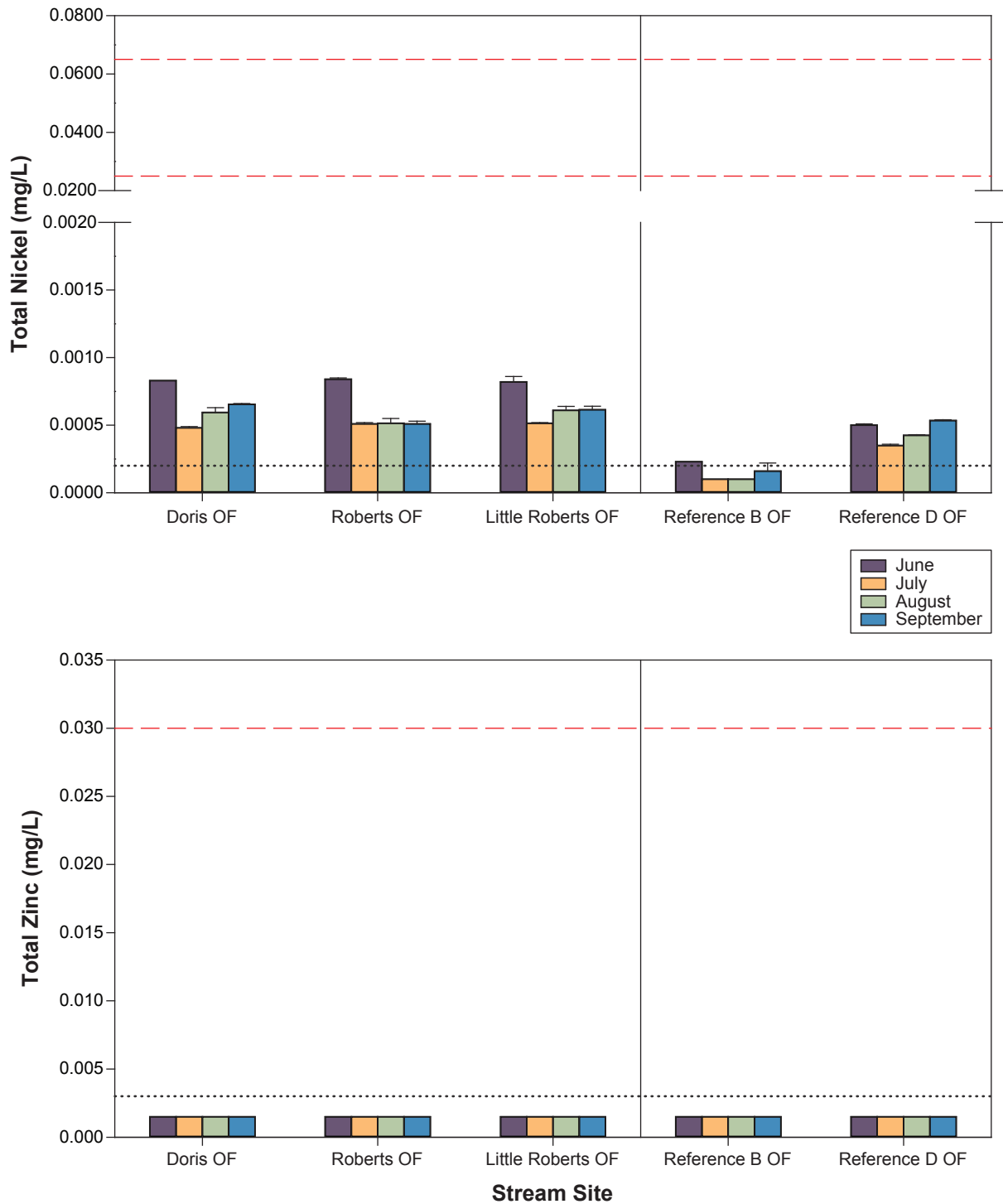
**Total Mercury and Total Molybdenum Concentrations
in Stream Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Red dashed lines represent the CCME freshwater guidelines for inorganic mercury (0.026 µg/L) and molybdenum (0.073 mg/L).
 Total mercury and total molybdenum are required parameters for effluent characterization as per Schedule 5, s. 4(1) of the MMR.

Figure A.3-9

**Total Nickel and Total Zinc Concentrations
in Stream Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 All total zinc concentrations in stream samples were below the detection limit.
 The CCME guideline for nickel is hardness dependent.
 Red dashed lines represent the CCME freshwater guideline for zinc (0.03 mg/L) and the minimum and maximum site-specific CCME guidelines for nickel (0.025 and 0.065 mg/L) based on the hardness (as CaCO₃) range in streams of 12.4 to 60.3 mg/L.
 Total nickel and total zinc are regulated as deleterious substances in effluents as per Schedule 4 of the MMER.

Annex A.3-1. Stream Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Date Sampled: ALS Sample ID:				Doris OF 1 14-Jun-2015 L1628043-1	Doris OF 2 14-Jun-2015 L1628043-2	Roberts OF 1 13-Jun-2015 L1628043-5	Roberts OF 2 13-Jun-2015 L1628043-6	Little Roberts OF 1 13-Jun-2015 L1628043-9	Little Roberts OF 2 13-Jun-2015 L1628043-10
CCME Guideline for the Protection of Aquatic life ^a	Units		Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	210	210	214	216	205	205
Hardness (as CaCO ₃)	mg/L		0.50	37.5	36.5	33.5	33.4	33.8	36.5
pH	pH	6.5 to 9.0	0.10	7.34	7.35	7.33	7.34	7.38	7.38
Total Suspended Solids	mg/L	dependent on background levels	1.0	3.5	3.8	4.0	4.6	4.4	4.4
Total Dissolved Solids	mg/L		10	121	126	122	126	127	123
Turbidity	NTU	dependent on background levels	0.10	4.18	3.91	3.89	4.13	3.93	4.78
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	22.2	21.8	20.8	20.6	21.1	20.8
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	0.0137	0.0138	0.0068	0.0066
Bromide (Br)	mg/L		0.050	0.164	0.166	0.178	0.179	0.161	0.164
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	49.9	49.9	52.3	52.2	49.3	49.5
Fluoride (F)	mg/L	0.12 ^b	0.020	0.043	0.042	0.040	0.041	0.041	0.041
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.423	0.400	0.487	0.470	0.424	0.417
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	0.0012	0.0013	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0203	0.0184	0.0226	0.0236	0.0199	0.0196
Sulfate (SO ₄)	mg/L		0.30	2.15	2.15	2.66	2.65	2.53	2.55
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic/ Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	7.08	6.51	7.52	7.72	6.71	7.38
Total Organic Carbon	mg/L		0.50	6.84	7.36	7.44	7.57	6.78	6.74
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.160	0.172	0.205	0.189	0.194	0.228
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000231	0.000220	0.000278	0.000280	0.000251	0.000289
Barium (Ba)-Total	mg/L		0.00010	0.00477	0.00502	0.00466	0.00425	0.00460	0.00515
Beryllium (Be)-Total	mg/L		0.0000050	0.0000073	0.0000085	0.0000098	0.0000085	0.0000075	0.0000093
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.028	0.026	0.028	0.027	0.026	0.028
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	6.22	6.07	4.46	4.45	5.05	5.47
Cesium (Cs)-Total	mg/L		0.0000050	0.0000083	0.0000096	0.0000142	0.0000138	0.0000137	0.0000150
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	0.000162	0.000172	0.000154	0.000146	0.000138	0.000147
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00118	0.00117	0.00120	0.00120	0.00116	0.00126
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000054	<0.000050	<0.000050	0.000066
Iron (Fe)-Total	mg/L	0.3	0.030	0.379	0.382	0.635	0.629	0.481	0.527
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	0.000076	0.000076	0.000072	0.000079	0.000093	0.000084
Lithium (Li)-Total	mg/L		0.00040	0.00235	0.00237	0.00182	0.00181	0.00188	0.00208
Magnesium (Mg)-Total	mg/L		0.10	5.33	5.19	5.43	5.43	5.14	5.55
Manganese (Mn)-Total	mg/L		0.00020	0.0449	0.0441	0.0846	0.0827	0.0447	0.0486
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00188	0.00175	0.00229	0.00225	0.00203	0.00204
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	0.000158	0.000137	0.000133	0.000129	0.000132	0.000139
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00083	0.00083	0.00083	0.00085	0.00078	0.00086
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	2.4	2.4	2.2	2.2	2.2	2.4
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00169	0.00170	0.00159	0.00152	0.00154	0.00172
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	1.66	1.69	1.56	1.50	1.49	1.67
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	28.2	27.5	29.5	29.5	27.2	29.6
Strontium (Sr)-Total	mg/L		0.00020	0.0390	0.0385	0.0382	0.0378	0.0374	0.0423
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000653	0.0000693	0.0000968	0.0000990	0.0000868	0.000102
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00559	0.00536	0.00914	0.00880	0.00838	0.00959
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000356	0.0000346	0.0000451	0.0000452	0.0000411	0.0000443
Vanadium (V)-Total	mg/L		0.000050	0.000345	0.000365	0.000489	0.000469	0.000460	0.000507
Yttrium (Y)-Total	mg/L		0.0000050	0.0000645	0.0000632	0.0000941	0.0000923	0.0000859	0.0000905
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	0.000101	0.000095	0.000125	0.000093	0.000216	0.000101
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{0.83[log(hardness)] - 2.46 }. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^{0.8545[ln(hardness)]-1.465 }. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{1.273[ln(hardness)]-4.705 }. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{0.76[ln(hardness)]+1.06 }. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-1. Stream Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Date Sampled: ALS Sample ID:				Reference B OF 1 14-Jun-2015 L1628043-7	Reference B OF 2 14-Jun-2015 L1628043-8	Reference D OF 1 14-Jun-2015 L1628043-3	Reference D OF 2 14-Jun-2015 L1628043-4	Doris OF 1 17-Jul-2015 L1645954-11	Doris OF 2 17-Jul-2015 L1645954-12
CCME Guideline for the Protection of Aquatic life ^a	Units		Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	60.0	60.1	91.7	92.0	270	268
Hardness (as CaCO ₃)	mg/L		0.50	17.8	18.1	18.2	17.9	47.1	46.3
pH	pH	6.5 to 9.0	0.10	7.19	7.21	7.16	7.15	7.62	7.64
Total Suspended Solids	mg/L	dependent on background levels	1.0	<1.0	<1.0	1.6	1.7	3.3	3.3
Total Dissolved Solids	mg/L		10	40	41	57	61	152	151
Turbidity	NTU	dependent on background levels	0.10	0.49	0.46	2.15	2.30	3.46	3.73
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	13.8	14.2	11.9	11.8	31.9	30.6
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	0.0052	0.0056	0.0139	0.0140
Bromide (Br)	mg/L		0.050	<0.050	<0.050	0.064	0.060	0.199	0.200
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	7.99	7.99	19.0	18.9	61.1	61.3
Fluoride (F)	mg/L	0.12 ^b	0.020	0.022	0.022	0.031	0.032	0.049	0.050
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	0.0097	0.0097	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.248	0.234	0.268	0.276	0.463	0.434
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0046	0.0042	0.0073	0.0075	0.0202	0.0227
Sulfate (SO ₄)	mg/L		0.30	1.96	1.96	1.73	1.72	2.51	2.52
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic/ Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	3.80	3.90	4.57	4.63	6.07	6.29
Total Organic Carbon	mg/L		0.50	3.79	3.70	4.64	4.54	6.55	6.36
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0114	0.0118	0.114	0.116	0.0489	0.0542
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	<0.000030	<0.000030	0.000031	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000094	0.000087	0.000116	0.000107	0.000252	0.000254
Barium (Ba)-Total	mg/L		0.00010	0.00259	0.00265	0.00311	0.00302	0.00287	0.00290
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000053	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.010	0.010	0.017	0.016	0.028	0.030
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	4.38	4.48	2.93	2.86	8.49	8.37
Cesium (Cs)-Total	mg/L		0.0000050	0.0000063	0.0000059	0.0000096	0.0000095	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000064	0.000069	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00072	0.00072	0.00088	0.00088	0.00111	0.00107
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.066	0.068	0.195	0.199	0.167	0.160
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00045	0.00046	0.00103	0.00104	0.00342	0.00338
Magnesium (Mg)-Total	mg/L		0.10	1.66	1.68	2.65	2.60	6.30	6.17
Manganese (Mn)-Total	mg/L		0.00020	0.00764	0.00767	0.0170	0.0171	0.0194	0.0199
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00104	0.00104	0.00124	0.00124	0.00063	0.00090
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	<0.000050	<0.000050	0.000062	0.000052	0.000134	0.000105
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00023	0.00023	0.00049	0.00051	0.00047	0.00049
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	<2.0	<2.0	<2.0	<2.0	2.2	2.2
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.000937	0.000955	0.00116	0.00113	0.00133	0.00133
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	0.208	0.210	0.527	0.524	1.39	1.39
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	4.7	4.7	11.0	10.9	30.5	29.9
Strontium (Sr)-Total	mg/L		0.00020	0.0236	0.0238	0.0192	0.0186	0.0524	0.0520
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000196	0.0000141	0.0000605	0.0000563	0.0000161	0.0000149
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00039	0.00040	0.00499	0.00506	0.00153	0.00165
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000043	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000408	0.0000416	0.0000370	0.0000364	0.0000261	0.0000243
Vanadium (V)-Total	mg/L		0.000050	<0.000050	0.000051	0.000254	0.000249	0.000145	0.000144
Yttrium (Y)-Total	mg/L		0.0000050	0.0000181	0.0000185	0.0000497	0.0000499	0.0000207	0.0000210
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000080	0.000054	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L		0.010	0.014	<0.01	<0.01	<0.01	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{0.83[log(hardness)] - 2.46 }. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^{0.8545[ln(hardness)]-1.465 }. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{1.273[ln(hardness)]-4.705 }. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{0.76[ln(hardness)]+1.06 }. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-1. Stream Water Quality Data, Doris North Project, 2015

Site ID:				Roberts OF	Roberts OF	Little Roberts OF	Little Roberts OF	Reference B OF	Reference B OF
Replicate:				1	2	1	2	1	2
Date Sampled:				18-Jul-2015	18-Jul-2015	17-Jul-2015	17-Jul-2015	16-Jul-2015	16-Jul-2015
ALS Sample ID:	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit	L1645954-13	L1645954-14	L1645954-7	L1645954-8	L1644333-3	L1644291-3
Physical Tests									
Conductivity	uS/cm		2.0	237	235	252	250	44.7	46.1
Hardness (as CaCO ₃)	mg/L		0.50	36.3	36.2	42.3	42.5	12.6	12.4
pH	pH	6.5 to 9.0	0.10	7.52	7.51	7.55	7.53	7.18	7.28
Total Suspended Solids	mg/L	dependent on background levels	1.0	3.1	4.0	2.3	2.9	<1.0	<1.0
Total Dissolved Solids	mg/L		10	126	133	132	135	21	25
Turbidity	NTU	dependent on background levels	0.10	2.33	3.26	2.69	2.61	0.37	0.42
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	22.7	22.1	26.4	26.0	10.2	10.1
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		0.050	0.185	0.185	0.192	0.190	<0.050	<0.050
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	54.8	54.8	57.9	57.7	6.05	6.06
Fluoride (F)	mg/L	0.12 ^b	0.020	0.041	0.041	0.046	0.046	<0.020	<0.020
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.361	0.355	0.447	0.381	0.161	0.156
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0140	0.0171	0.0166	0.0162	0.0023	0.0025
Sulfate (SO ₄)	mg/L		0.30	3.84	3.84	3.13	3.13	1.54	1.54
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	5.56	5.51	6.52	5.99	2.88	2.88
Total Organic Carbon	mg/L		0.50	5.79	5.69	5.99	6.03	2.86	2.92
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.107	0.121	0.0923	0.0940	0.0082	0.0077
Antimony (Sb)-Total	mg/L		0.000030	0.000031	0.000032	0.000031	0.000031	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000257	0.000255	0.000254	0.000257	0.000070	0.000066
Barium (Ba)-Total	mg/L		0.00010	0.00281	0.00296	0.00298	0.00286	0.00148	0.00142
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.035	0.035	0.033	0.034	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	5.22	5.19	7.00	7.01	3.11	3.05
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	0.0000052	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00128	0.00126	0.00124	0.00125	0.00062	0.00061
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.134	0.154	0.168	0.167	0.032	0.031
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00230	0.00234	0.00294	0.00286	<0.00040	<0.00040
Magnesium (Mg)-Total	mg/L		0.10	5.65	5.65	6.02	6.07	1.18	1.16
Manganese (Mn)-Total	mg/L		0.00020	0.00736	0.00796	0.0120	0.0121	0.00159	0.00144
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00064	0.00062	0.00063	0.00061	0.00061	0.00068
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	0.000136	0.000136	0.000119	0.000120	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00050	0.00052	0.00052	0.00051	<0.00020	<0.00020
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	<2.0	<2.0	2.1	2.1	<2.0	<2.0
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00129	0.00128	0.00136	0.00136	0.000710	0.000707
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	0.545	0.581	1.03	1.00	0.094	0.081
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	29.8	29.7	30.0	30.1	3.4	3.3
Strontium (Sr)-Total	mg/L		0.00020	0.0418	0.0415	0.0479	0.0486	0.0154	0.0150
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000284	0.0000348	0.0000239	0.0000244	0.0000082	0.0000068
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00258	0.00336	0.00224	0.00233	<0.00020	<0.00020
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000400	0.0000405	0.0000325	0.0000336	0.0000317	0.0000305
Vanadium (V)-Total	mg/L		0.000050	0.000194	0.000222	0.000198	0.000221	<0.000050	<0.000050
Yttrium (Y)-Total	mg/L		0.0000050	0.0000347	0.0000377	0.0000298	0.0000301	0.0000112	0.0000111
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	0.000055	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{0.83[log(hardness)] - 2.46 }. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^{0.8545[ln(hardness)]-1.465 }. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{1.273[ln(hardness)]-4.705 }. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{0.76[ln(hardness)]+1.06 }. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-1. Stream Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Date Sampled: ALS Sample ID:				Reference D OF 1 17-Jul-2015 L1645954-9	Reference D OF 2 17-Jul-2015 L1645954-10	Doris OF 1 15-Aug-2015 L1658889-3	Doris OF 2 15-Aug-2015 L1658889-4	Roberts OF 1 15-Aug-2015 L1658889-5	Roberts OF 2 15-Aug-2015 L1658889-6
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	95.8	95.5	265	266	246	248
Hardness (as CaCO ₃)	mg/L		0.50	16.9	17.2	47.3	47.4	37.8	37.4
pH	pH	6.5 to 9.0	0.10	7.26	7.26	7.60	7.65	7.48	7.48
Total Suspended Solids	mg/L	dependent on background levels	1.0	<1.0	<1.0	4.5	4.5	3.0	3.0
Total Dissolved Solids	mg/L		10	54	52	153	150	139	145
Turbidity	NTU	dependent on background levels	0.10	0.97	0.98	5.84	5.76	3.31	3.41
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	11.9	12.1	32.0	31.7	24.4	25.0
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	<0.0050	0.0054	<0.0050	<0.0050
Bromide (Br)	mg/L		0.050	0.057	0.056	0.192	0.192	0.188	0.189
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	19.2	19.2	58.6	58.6	55.7	56.0
Fluoride (F)	mg/L	0.12 ^b	0.020	0.031	0.031	0.053	0.053	0.046	0.046
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.230	0.212	0.576	0.537	0.362	0.415
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	0.0012	0.0011	<0.0010	0.0015
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0040	0.0043	0.0274	0.0209	0.0114	0.0121
Sulfate (SO ₄)	mg/L		0.30	1.71	1.71	2.48	2.48	3.87	3.88
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic/ Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	4.33	4.31	6.33	5.81	5.40	5.49
Total Organic Carbon	mg/L		0.50	4.23	4.30	6.20	6.02	5.55	5.67
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0700	0.0674	0.0950	0.0501	0.0593	0.0628
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000112	0.000111	0.000274	0.000258	0.000266	0.000279
Barium (Ba)-Total	mg/L		0.00010	0.00221	0.00219	0.00350	0.00298	0.00242	0.00261
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.016	0.015	0.027	0.030	0.029	0.032
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	2.68	2.72	8.67	8.65	5.54	5.51
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	0.0000063	<0.0000050	0.0000051	0.0000063
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000080	0.000056	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00087	0.00084	0.00135	0.00127	0.00142	0.00145
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.088	0.093	0.210	0.141	0.121	0.123
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00116	0.00119	0.00316	0.00320	0.00209	0.00208
Magnesium (Mg)-Total	mg/L		0.10	2.48	2.52	6.24	6.27	5.81	5.75
Manganese (Mn)-Total	mg/L		0.00020	0.00290	0.00317	0.0282	0.0221	0.00718	0.00709
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00070	0.00064	0.00066	0.00067	0.00064	0.00071
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	<0.000050	<0.000050	0.000144	0.000142	0.000173	0.000181
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00036	0.00034	0.00063	0.00056	0.00055	0.00048
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	<2.0	<2.0	2.5	2.6	2.3	2.2
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00100	0.00102	0.00143	0.00146	0.00130	0.00129
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	0.234	0.237	1.56	1.48	0.544	0.559
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	10.2	10.4	32.4	33.3	33.5	33.4
Strontium (Sr)-Total	mg/L		0.00020	0.0167	0.0169	0.0431	0.0434	0.0361	0.0355
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000247	0.0000257	0.0000309	0.0000243	0.0000270	0.0000348
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00176	0.00195	0.00330	0.00137	0.00142	0.00149
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000292	0.0000290	0.0000374	0.0000332	0.0000487	0.0000526
Vanadium (V)-Total	mg/L		0.000050	0.000112	0.000117	0.000250	0.000157	0.000131	0.000135
Yttrium (Y)-Total	mg/L		0.0000050	0.0000243	0.0000251	0.0000420	0.0000311	0.0000483	0.0000496
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{0.83[log(hardness)] - 2.46 }. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^{0.8545[ln(hardness)]-1.465 }. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{1.273[ln(hardness)]-4.705 }. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{0.76[ln(hardness)]+1.06 }. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-1. Stream Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Date Sampled: ALS Sample ID:				Little Roberts OF 1 14-Aug-2015 L1658889-1	Little Roberts OF 2 14-Aug-2015 L1658889-2	Reference B OF 1 13-Aug-2015 L1658082-3	Reference B OF 2 13-Aug-2015 L1658082-4	Reference D OF 1 16-Aug-2015 L1658889-7	Reference D OF 2 16-Aug-2015 L1658889-8
CCME Guideline for the Protection of Aquatic life ^a	Units		Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	260	260	46.7	48.1	99.6	99.6
Hardness (as CaCO ₃)	mg/L		0.50	44.1	44.7	14.3	14.2	19.2	19.5
pH	pH	6.5 to 9.0	0.10	7.56	7.52	7.16	7.19	7.18	7.19
Total Suspended Solids	mg/L	dependent on background levels	1.0	3.5	3.6	<1.0	<1.0	1.1	<1.0
Total Dissolved Solids	mg/L		10	155	149	32	30	60	67
Turbidity	NTU	dependent on background levels	0.10	4.01	4.36	0.39	0.37	1.14	1.18
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	28.8	29.1	11.4	11.3	12.9	13.3
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		0.050	0.189	0.188	<0.050	<0.050	0.058	0.056
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	57.6	57.6	6.16	6.17	20.4	20.4
Fluoride (F)	mg/L	0.12 ^b	0.020	0.050	0.051	<0.020	<0.020	0.036	0.037
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	0.0065	0.0062	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.535	0.409	0.214	0.222	0.261	0.256
Orthophosphate-Dissolved (as P)	mg/L		0.0010	0.0012	<0.0010	<0.0010	<0.0010	0.0012	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0190	0.0178	0.0051	0.0036	0.0053	0.0053
Sulfate (SO ₄)	mg/L		0.30	3.20	3.20	1.44	1.45	1.76	1.76
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic/ Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	6.10	6.04	3.05	3.45	4.77	4.80
Total Organic Carbon	mg/L		0.50	6.36	6.13	3.46	3.15	4.85	4.97
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0839	0.0801	0.0081	0.0080	0.0455	0.0444
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000291	0.000285	0.000079	0.000093	0.000131	0.000135
Barium (Ba)-Total	mg/L		0.00010	0.00295	0.00302	0.00140	0.00140	0.00175	0.00167
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.029	0.030	<0.010	<0.010	0.019	0.019
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	7.55	7.59	3.49	3.50	3.04	3.10
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	0.0000054	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	0.000069	0.000070	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00134	0.00143	0.00076	0.00082	0.00108	0.00108
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.221	0.224	0.055	0.055	0.142	0.140
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00264	0.00273	0.00045	0.00048	0.00122	0.00123
Magnesium (Mg)-Total	mg/L		0.10	6.14	6.24	1.35	1.33	2.82	2.86
Manganese (Mn)-Total	mg/L		0.00020	0.0176	0.0183	0.00249	0.00242	0.00996	0.00837
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00066	0.00066	0.00061	0.00061	0.00072	0.00071
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	0.000160	0.000171	<0.000050	<0.000050	0.000060	0.000068
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00058	0.00064	<0.00020	<0.00020	0.00043	0.00042
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	2.1	2.4	<2.0	<2.0	<2.0	<2.0
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00140	0.00143	0.000697	0.000704	0.00104	0.00105
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	1.29	1.30	0.130	0.133	0.365	0.367
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	30.5	33.2	3.8	3.7	12.7	13.0
Strontium (Sr)-Total	mg/L		0.00020	0.0408	0.0422	0.0154	0.0158	0.0170	0.0176
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000311	0.0000303	0.0000075	0.0000075	0.0000359	0.0000410
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00210	0.00205	<0.00020	<0.00020	0.00100	0.00094
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000407	0.0000416	0.0000409	0.0000399	0.0000527	0.0000539
Vanadium (V)-Total	mg/L		0.000050	0.000198	0.000202	<0.000050	<0.000050	0.000107	0.000109
Yttrium (Y)-Total	mg/L		0.0000050	0.0000494	0.0000518	0.0000198	0.0000188	0.0000465	0.0000468
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	0.000056	0.000056	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{0.83[log(hardness)] - 2.46 }. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^{0.8545[ln(hardness)]-1.465 }. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{1.273[ln(hardness)]-4.705 }. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{0.76[ln(hardness)]+1.06 }. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-1. Stream Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Date Sampled: ALS Sample ID:				Doris OF 1 17-Sep-2015 L1675358-11	Doris OF 2 17-Sep-2015 L1675358-12	Roberts OF 1 20-Sep-2015 L1676833-11	Roberts OF 2 20-Sep-2015 L1676833-12	Little Roberts OF 1 16-Sep-2015 L1675358-8	Little Roberts OF 2 16-Sep-2015 L1675358-9
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	267	265	247	247	259	258
Hardness (as CaCO ₃)	mg/L		0.50	47.4	46.4	38.7	37.7	60.3	43.1
pH	pH	6.5 to 9.0	0.10	7.75	7.77	7.52	7.50	7.40	7.45
Total Suspended Solids	mg/L	dependent on background levels	1.0	6.0	5.7	2.7	2.9	5.1	4.5
Total Dissolved Solids	mg/L		10	161	144	136	145	156	154
Turbidity	NTU	dependent on background levels	0.10	6.30	5.70	2.89	2.72	5.68	5.37
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	31.8	31.4	23.8	23.6	29.2	29.1
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	0.0059	0.0055	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		0.050	0.200	0.205	0.195	0.199	0.200	0.204
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	60.0	59.5	57.3	57.3	60.5	60.2
Fluoride (F)	mg/L	0.12 ^b	0.020	0.054	0.054	0.044	0.044	0.051	0.051
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.507	0.522	0.368	0.338	0.489	0.511
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0258	0.0217	0.0149	0.0145	0.0248	0.0180
Sulfate (SO ₄)	mg/L		0.30	2.51	2.50	4.33	4.33	3.18	3.15
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic/ Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	6.47	6.05	5.15	5.23	5.92	6.39
Total Organic Carbon	mg/L		0.50	7.01	6.23	5.19	5.07	6.31	6.35
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.101	0.0757	0.0905	0.0795	0.109	0.102
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000326	0.000313	0.000263	0.000244	0.000309	0.000280
Barium (Ba)-Total	mg/L		0.00010	0.00367	0.00350	0.00305	0.00270	0.00373	0.00357
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.036	0.032	0.038	0.034	0.036	0.035
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000215	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	8.74	8.56	5.78	5.59	14.1	7.49
Cesium (Cs)-Total	mg/L		0.0000050	0.0000066	0.0000060	0.0000062	0.0000060	0.0000076	0.0000075
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	0.000068	0.000055	<0.000050	<0.000050	0.000070	0.000061
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00128	0.00400	0.00153	0.00153	0.00144	0.00122
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.172	0.149	0.108	0.100	0.207	0.192
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000102	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00331	0.00335	0.00241	0.00232	0.00307	0.00288
Magnesium (Mg)-Total	mg/L		0.10	6.21	6.08	5.89	5.76	6.12	5.93
Manganese (Mn)-Total	mg/L		0.00020	0.0231	0.0181	0.00500	0.00454	0.0152	0.0124
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00058	0.00057	<0.00050	<0.00050	0.00056	0.00055
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	0.000173	0.000167	0.000192	0.000169	0.000204	0.000169
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00065	0.00066	0.00053	0.00049	0.00064	0.00059
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	2.3	2.3	2.1	<2.0	2.2	2.1
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00142	0.00138	0.00141	0.00132	0.00142	0.00136
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	1.52	1.43	0.401	0.376	1.20	1.17
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	31.8	31.4	31.9	31.0	31.8	31.0
Strontium (Sr)-Total	mg/L		0.00020	0.0411	0.0406	0.0367	0.0350	0.0446	0.0391
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000328	0.0000275	0.0000350	0.0000302	0.0000433	0.0000365
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00311	0.00231	0.00284	0.00247	0.00370	0.00326
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000368	0.0000358	0.0000480	0.0000461	0.0000395	0.0000373
Vanadium (V)-Total	mg/L		0.000050	0.000244	0.000199	0.000179	0.000168	0.000239	0.000217
Yttrium (Y)-Total	mg/L		0.0000050	0.0000315	0.0000277	0.0000393	0.0000361	0.0000592	0.0000365
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	0.000055	<0.000050	<0.000050	0.000775	<0.000050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	0.017	<0.0100	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{0.83[log(hardness)] - 2.46 }. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^{0.8545[ln(hardness)]-1.465}. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{1.273[ln(hardness)]-4.705}. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{0.76[ln(hardness)]+1.06 }. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-1. Stream Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Date Sampled: ALS Sample ID:				Reference B OF 1 18-Sep-2015 L1676833-9	Reference B OF 2 18-Sep-2015 L1676833-10	Reference D OF 1 16-Sep-2015 L1675358-5	Reference D OF 2 16-Sep-2015 L1675358-6
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit				
Physical Tests							
Conductivity	uS/cm		2.0	51.3	52.2	99.8	101
Hardness (as CaCO ₃)	mg/L		0.50	15.1	17.6	19	19.3
pH	pH	6.5 to 9.0	0.10	7.23	7.24	7.19	7.16
Total Suspended Solids	mg/L	dependent on background levels	1.0	<1.0	<1.0	2.4	3.4
Total Dissolved Solids	mg/L		10	36	36	67	69
Turbidity	NTU	dependent on background levels	0.10	0.35	0.32	3.27	3.28
Anions and Nutrients							
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	11.1	12.0	12.4	12.6
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	0.0057	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		0.050	<0.050	<0.050	0.066	0.061
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	6.72	6.73	21.5	21.5
Fluoride (F)	mg/L	0.12 ^b	0.020	0.020	0.020	0.035	0.035
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	0.0084	0.0094	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.239	0.180	0.287	0.310
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0041	0.0039	0.0098	0.0083
Sulfate (SO ₄)	mg/L		0.30	1.76	1.77	1.89	1.89
Cyanides							
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic/ Inorganic Carbon							
Dissolved Organic Carbon	mg/L		0.50	3.35	3.30	4.77	4.67
Total Organic Carbon	mg/L		0.50	3.07	3.05	4.56	4.81
Total Metals							
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0070	0.0083	0.167	0.159
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000095	0.000100	0.000159	0.000163
Barium (Ba)-Total	mg/L		0.00010	0.00162	0.00172	0.00357	0.00339
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	0.0000057	0.0000061
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.014	0.014	0.022	0.020
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	3.73	4.69	2.98	3.01
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	0.0000120	0.0000118
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000076	0.000074
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00084	0.00089	0.00101	0.00105
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.034	0.034	0.232	0.230
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	<0.000050	<0.000050	0.000067	0.000064
Lithium (Li)-Total	mg/L		0.00040	0.00096	0.00097	0.00152	0.00147
Magnesium (Mg)-Total	mg/L		0.10	1.41	1.44	2.81	2.85
Manganese (Mn)-Total	mg/L		0.00020	0.00141	0.00197	0.00533	0.00514
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	<0.00050	<0.00050	0.00056	0.00056
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	<0.000050	<0.000050	0.000073	0.000070
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	<0.00020	0.00022	0.00054	0.00053
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	<2.0	<2.0	<2.0	<2.0
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.000795	0.000815	0.00125	0.00124
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	0.109	0.117	0.619	0.588
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	3.9	4.0	12.2	12.3
Strontium (Sr)-Total	mg/L		0.00020	0.0170	0.0179	0.0184	0.0184
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000100	0.0000109	0.0000747	0.0000703
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	<0.00020	<0.00020	0.00760	0.00727
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000502	0.0000537	0.0000459	0.0000466
Vanadium (V)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000345	0.000336
Yttrium (Y)-Total	mg/L		0.0000050	0.0000135	0.0000186	0.0000613	0.0000618
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters							
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^[0.83(log(hardness)) - 2.46]. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation:

CWQG (mg/L) = 0.0002 * e^{[0.8545[ln(hardness)]-1.465]}. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

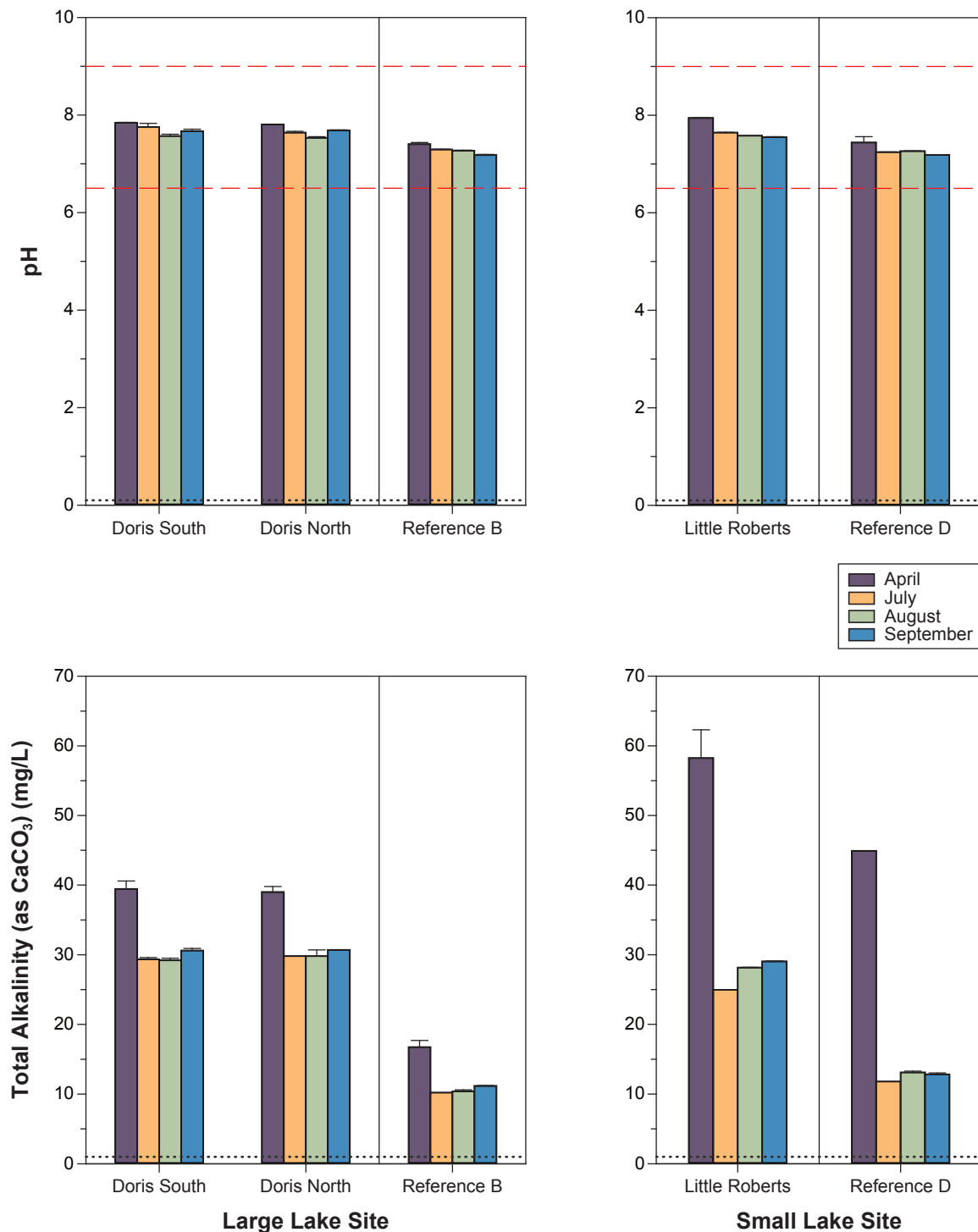
^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation:

CWQG (mg/L)= 0.001*e^{[1.273[ln(hardness)]-4.705]}. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{[0.76[ln(hardness)]+1.06]}. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Figure A.3-10

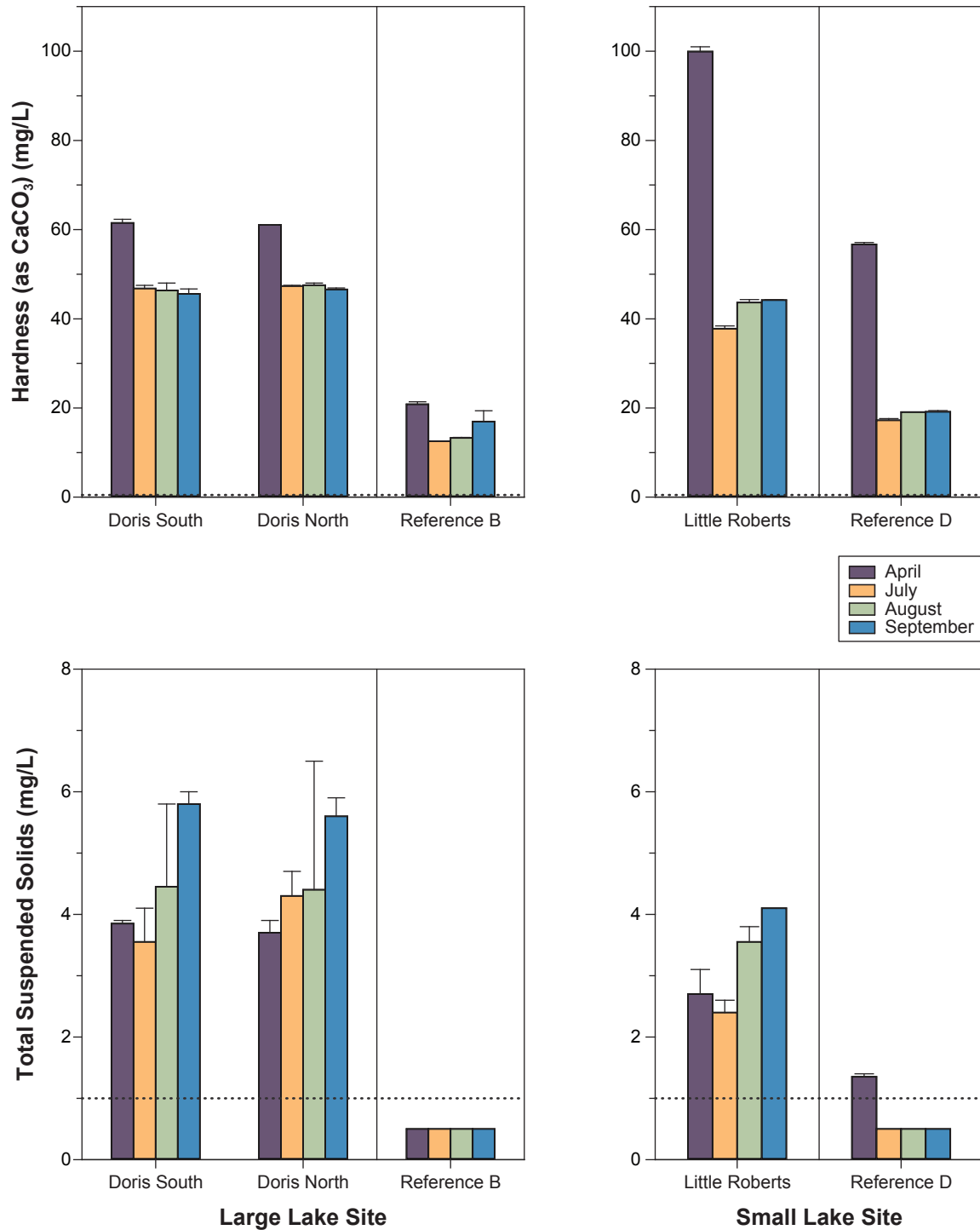
pH and Total Alkalinity in Lake Sites,
Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits.
 Red dashed lines represent the CCME freshwater guideline pH range (6.5–9.0).
 pH is a required parameter for water quality monitoring as per Schedule 5, s. 7(1)(c) of the MMER.
 Total alkalinity is a required parameter for effluent characterization and water quality monitoring as per Schedule 5, s. 4(1) and s. 7(1)(c) of the MMER.

Figure A.3-11

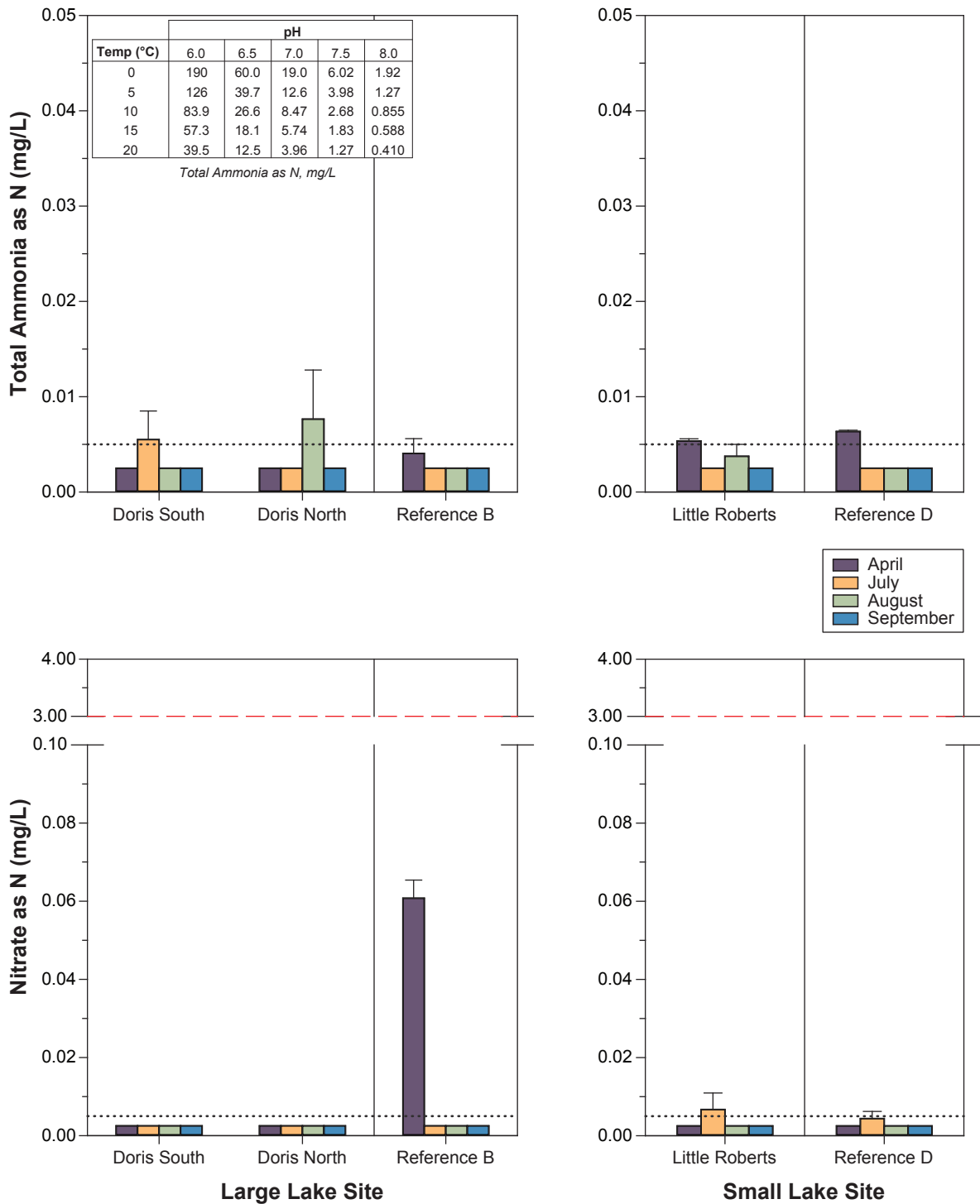
Hardness and Total Suspended Solids in Lake Sites, Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 The CCME freshwater guideline for total suspended solids is dependent upon background levels.
 Hardness is a required parameter for effluent characterization and water quality monitoring as per Schedule 5, s. 4(1) and s. 7(1)(c) of the MMER.
 Total suspended solids are regulated as deleterious substances in effluents as per Schedule 4 of the MMER.

Figure A.3-12

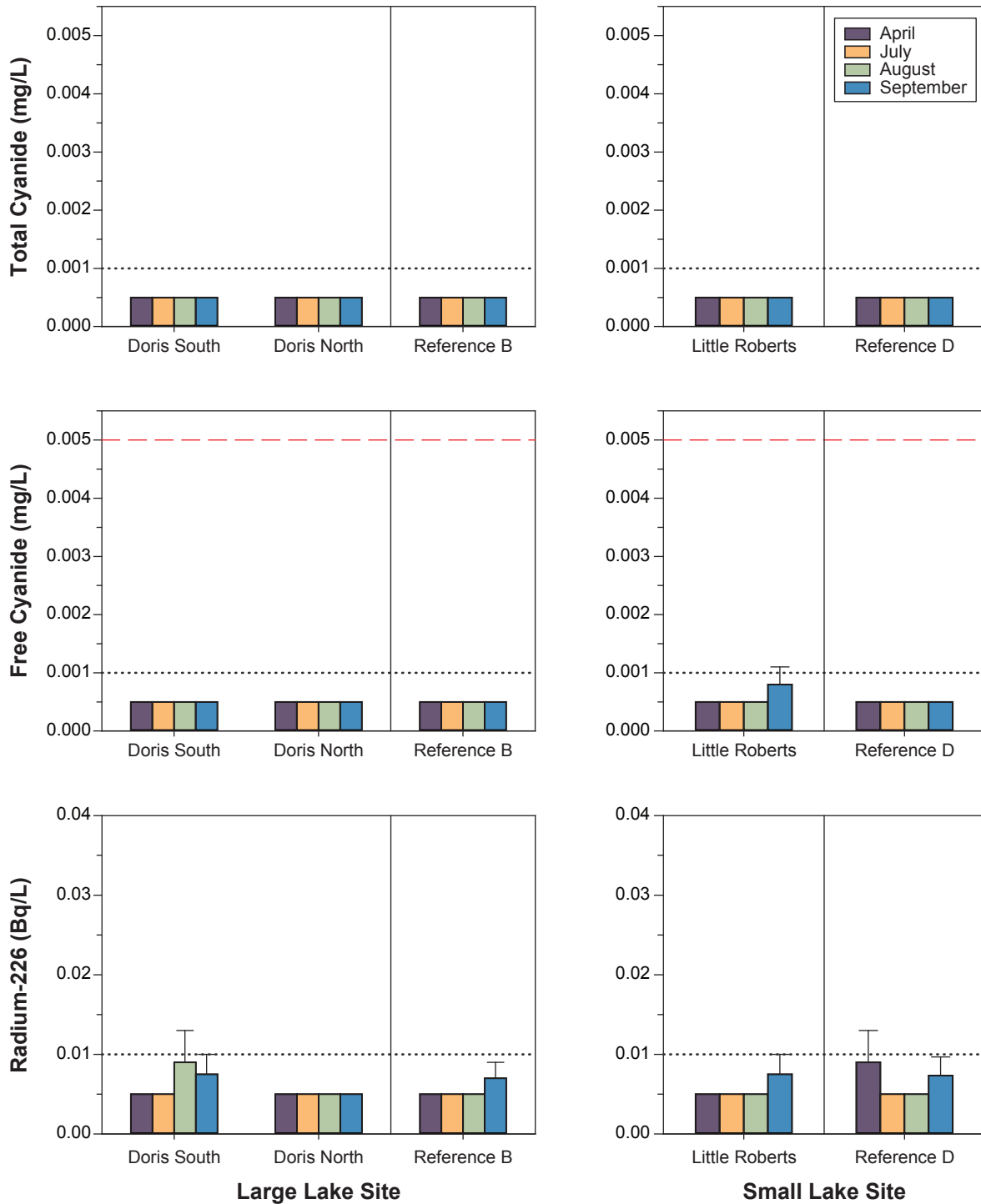
Total Ammonia and Nitrate Concentrations in Lake Sites, Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Inset table shows the pH- and temperature-dependent CCME freshwater guideline for total ammonia.
 Red dashed line represents the CCME freshwater guideline for nitrate as N (3.0 mg/L; long-term concentration).
 Total ammonia and nitrate are required parameters for effluent characterization as per Schedule 5, s. 4(1) of the MMER.

Figure A.3-13

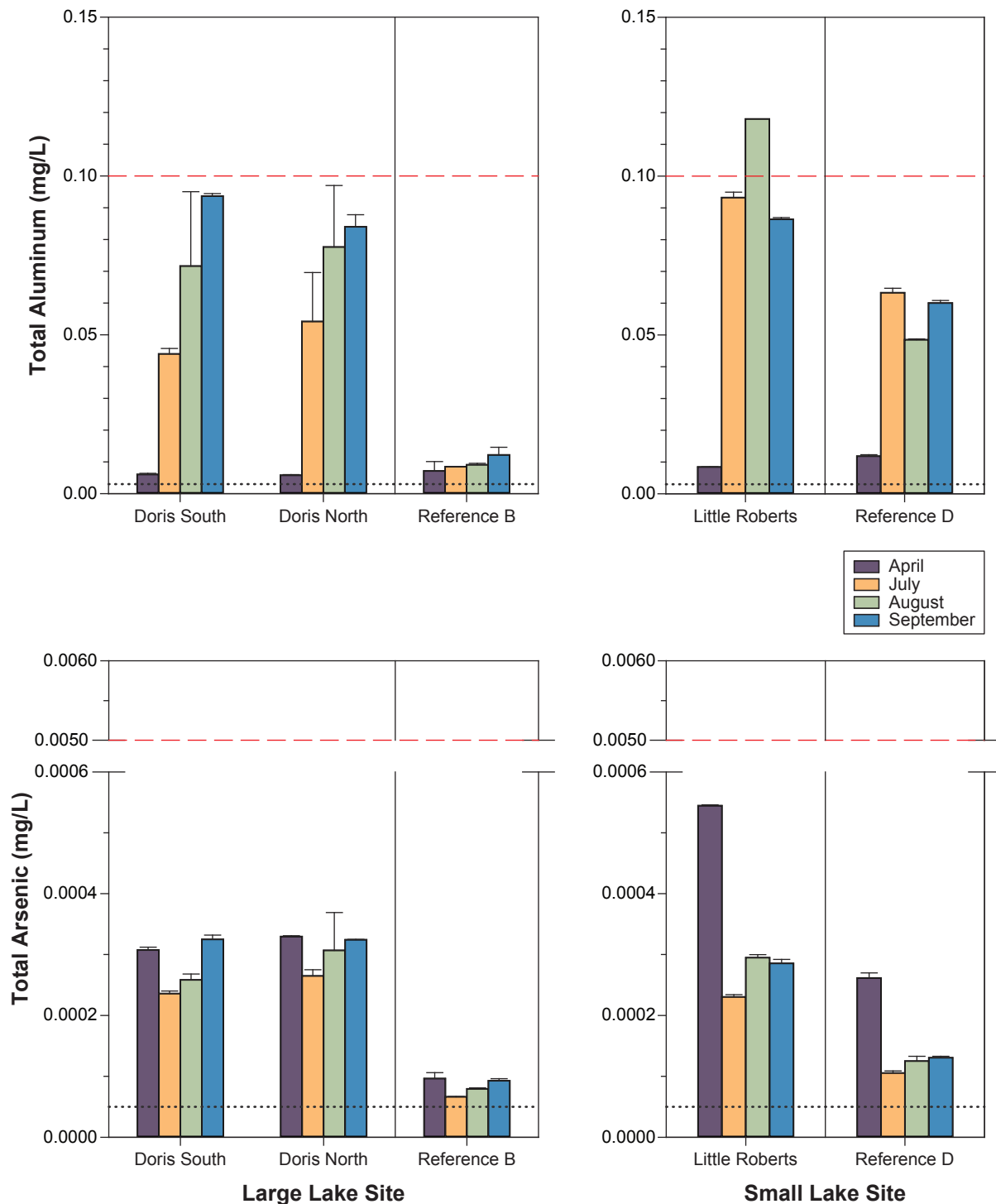
**Total Cyanide, Free Cyanide, and Radium-226
Concentrations in Lake Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 All total cyanide concentrations in lake samples were below the detection limit.
 Red dashed line represents the CCME freshwater guideline for free cyanide (0.005 mg/L).
 Total cyanide and radium-226 are regulated as deleterious substances in effluents as per Schedule 4 of the MMER.

Figure A.3-14

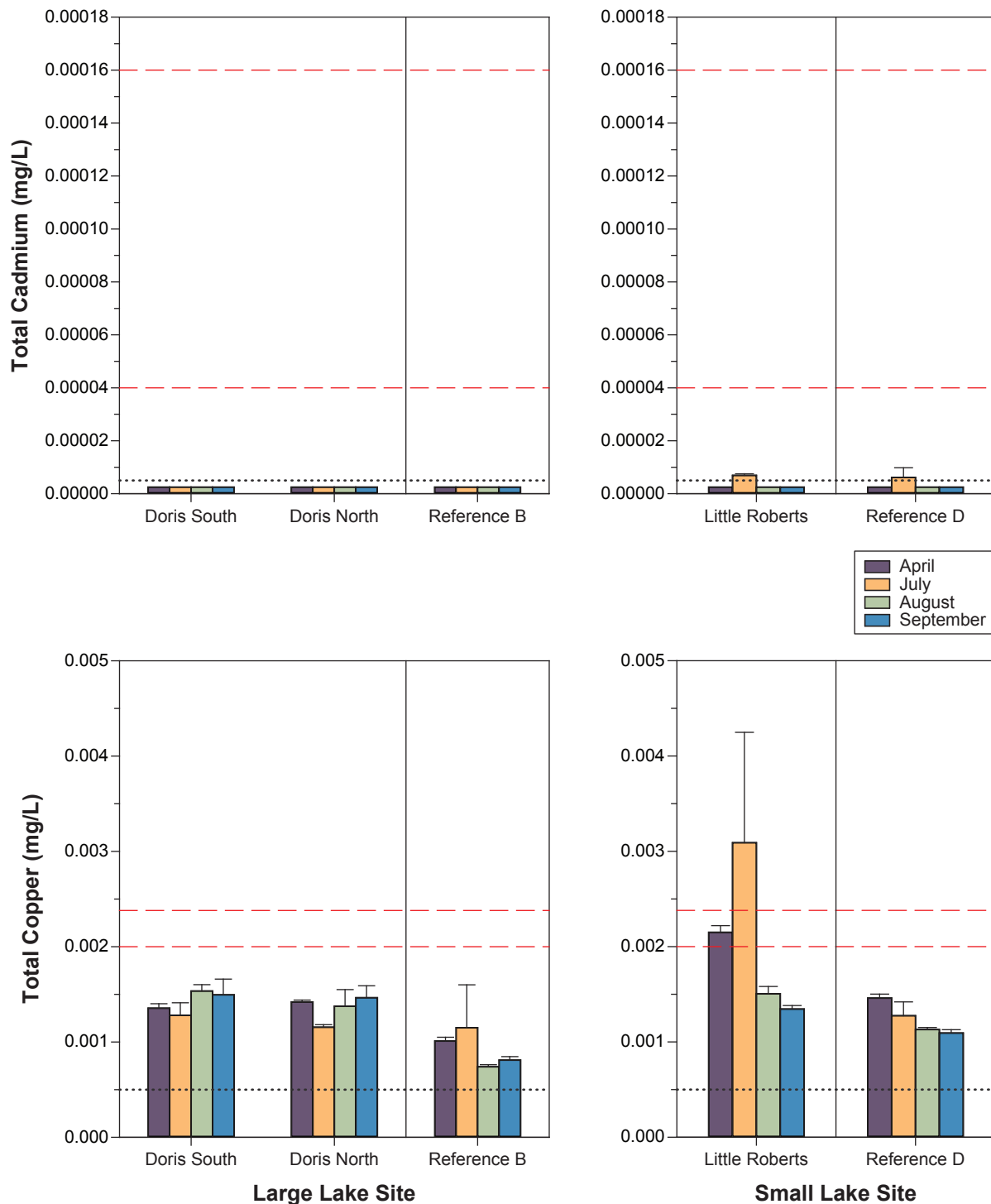
**Total Aluminum and Total Arsenic Concentrations
in Lake Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Red dashed lines represent the pH-dependent CCME freshwater guideline for aluminum (0.005 mg/L at pH < 6.5; 0.1 mg/L at pH ≥ 6.5) and the CCME freshwater guideline for arsenic (0.005 mg/L).
 pH was greater than 6.5 in all lake samples.
 Total aluminum is a required parameter for effluent characterization as per Schedule 5, s. 4(1) of the MMER.
 Total arsenic is regulated as a deleterious substance in effluents as per Schedule 4 of the MMER.

Figure A.3-15

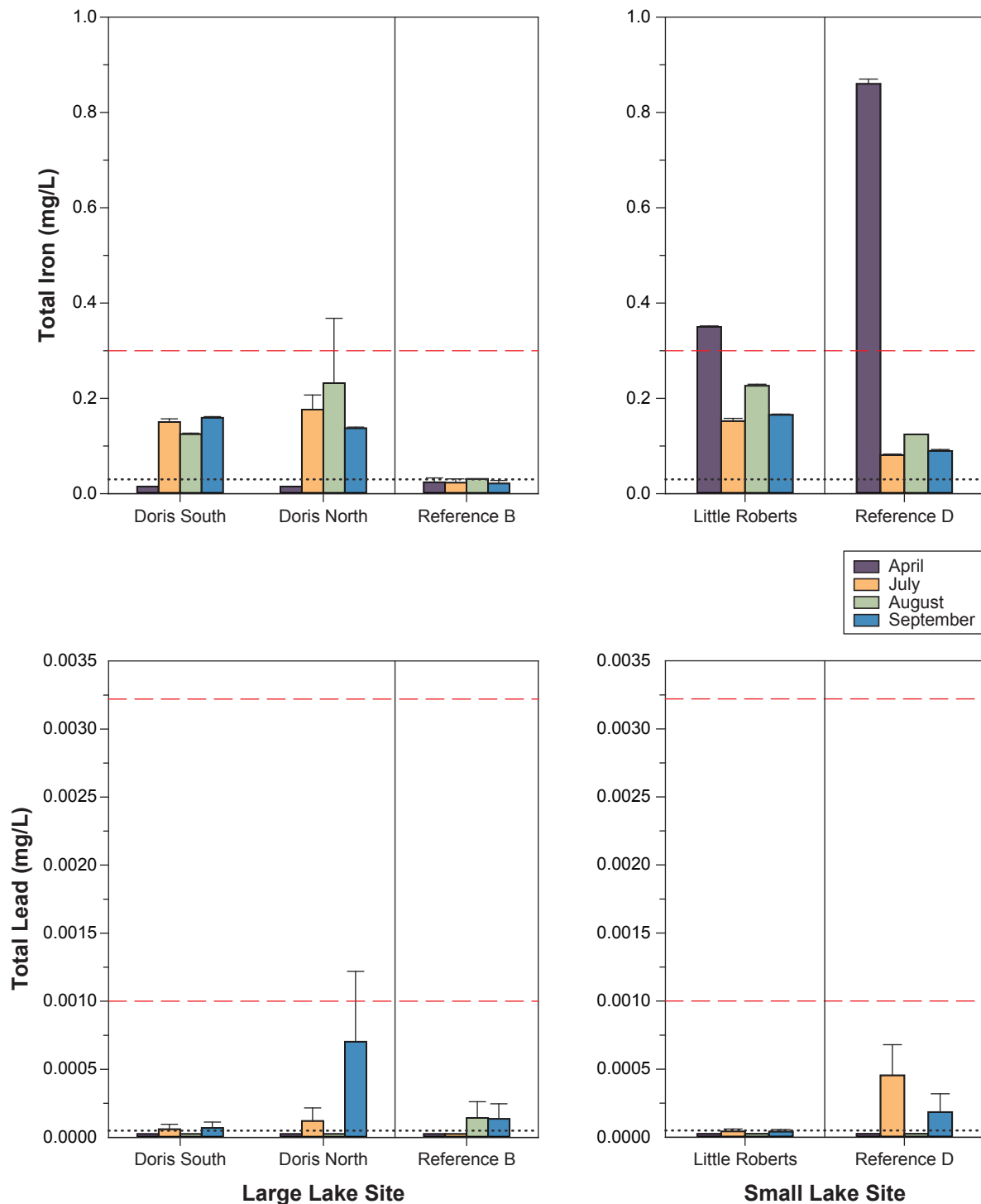
Total Cadmium and Total Copper Concentrations in Lake Sites, Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 The CCME freshwater guidelines for cadmium and copper are hardness dependent.
 Red dashed lines represent the minimum and maximum site-specific CCME freshwater guidelines for cadmium (0.00004 and 0.00016 mg/L) and for copper (0.00200 to 0.00238 mg/L) based on the hardness (as CaCO₃) range in lakes of 12.5 to 101 mg/L.
 * Indicates that mean concentration is higher than the applicable CCME guideline.
 Total cadmium is a required parameter for effluent characterization as per Schedule 5, s. 4(1) of the MMER.
 Total copper is regulated as a deleterious substance in effluents as per Schedule 4 of the MMER.

Figure A.3-16

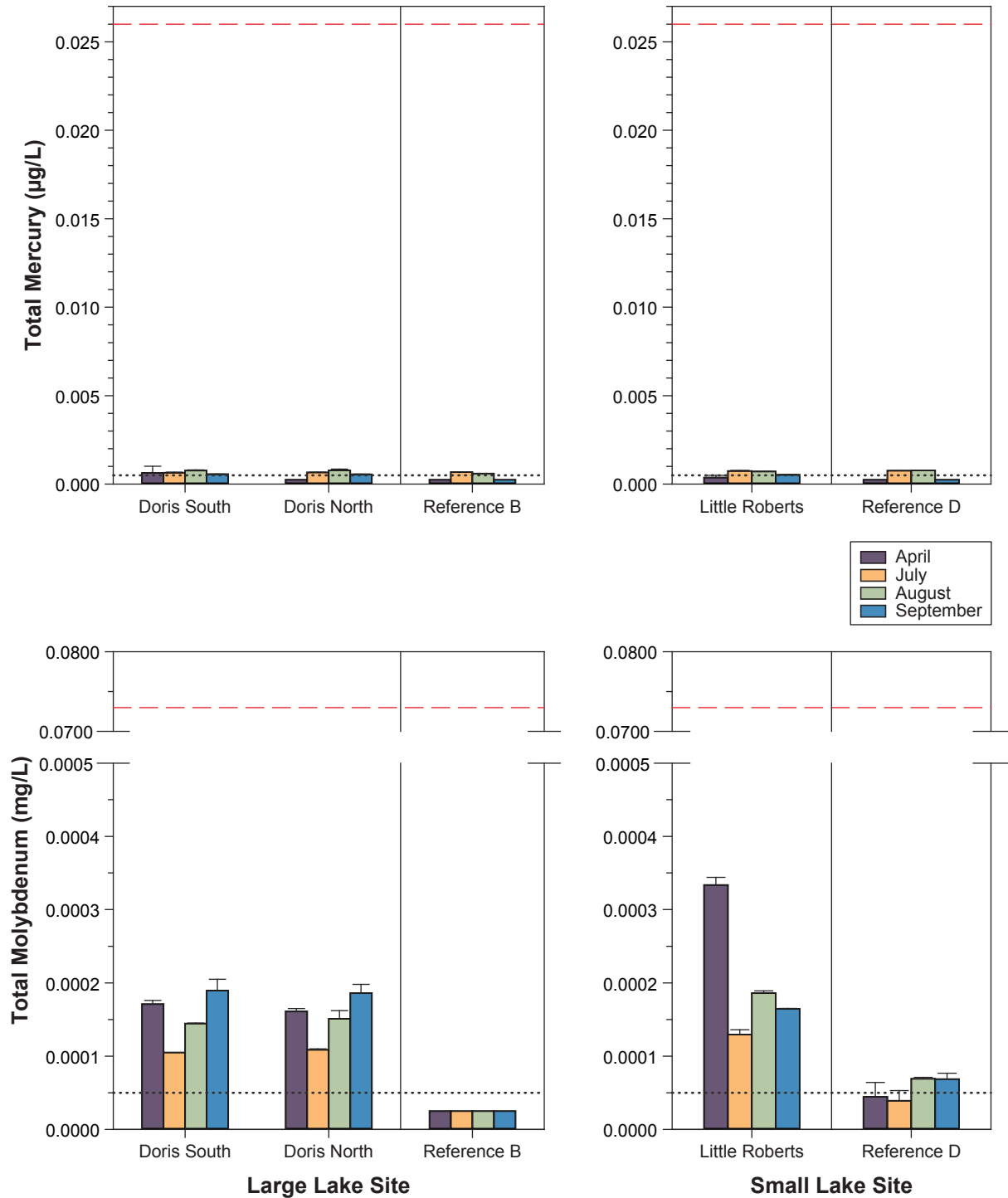
**Total Iron and Total Lead Concentrations
in Lake Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 The CCME freshwater guideline for lead is hardness dependent.
 Red dashed lines represent the CCME freshwater guideline for iron (0.3 mg/L) and the minimum and maximum site-specific CCME freshwater guideline for lead (0.001 and 0.00322 mg/L) based on the hardness (as CaCO₃) range in lakes of 12.5 to 101 mg/L.
 Total iron is a required parameter for effluent characterization as per Schedule 5, s. 4(1) of the MMER.
 Total lead is regulated as a deleterious substance in effluents as per Schedule 4 of the MMER.

Figure A.3-17

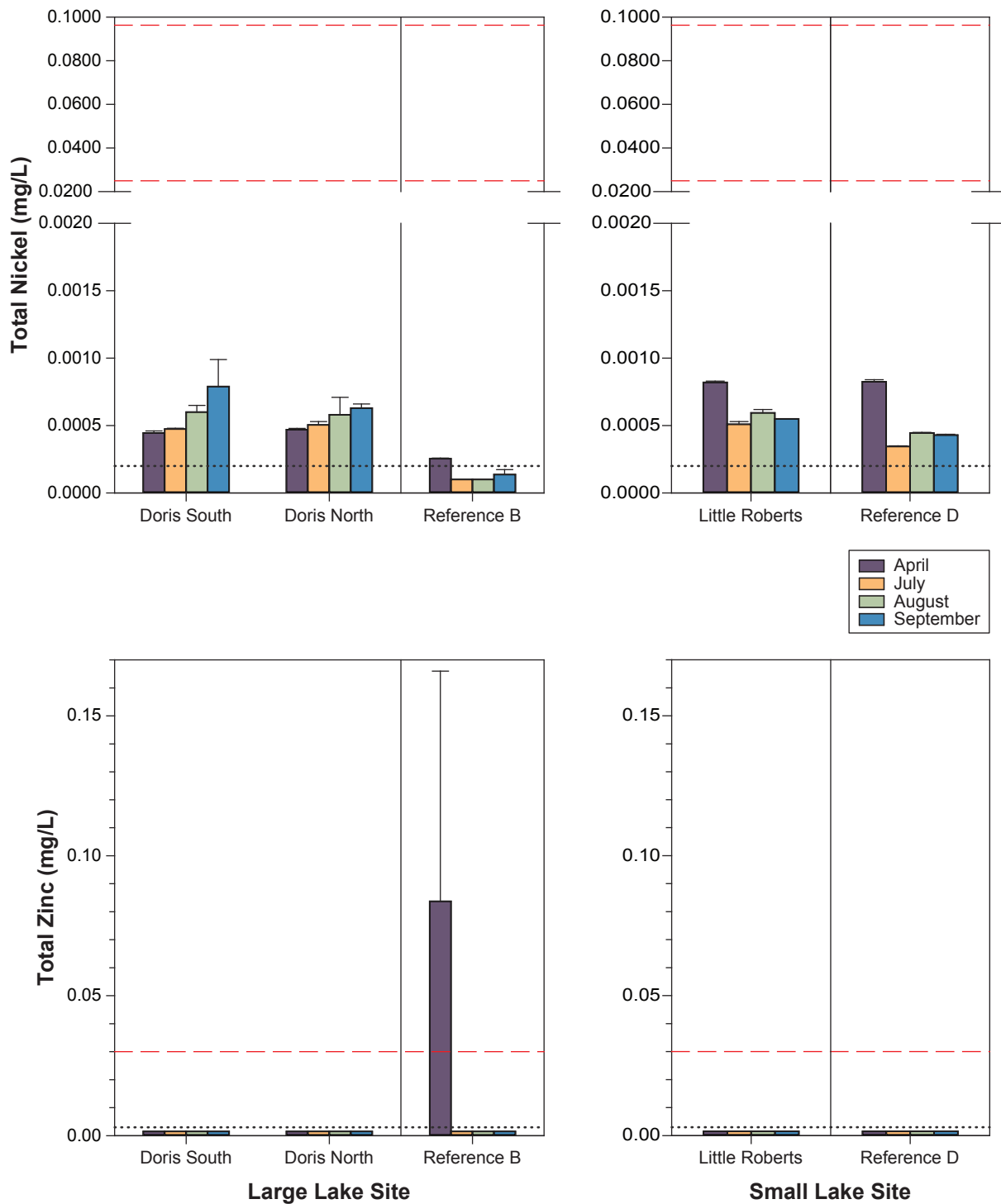
**Total Mercury and Total Molybdenum Concentrations
in Lake Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Red dashed lines represent the CCME freshwater guidelines for inorganic mercury (0.026 µg/L) and molybdenum (0.073 mg/L).
 Total mercury and total molybdenum are required parameters for effluent characterization as per Schedule 5, s. 4(1) of the MMER.

Figure A.3-18

**Total Nickel and Total Zinc Concentrations
in Lake Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 The CCME guideline for nickel is hardness dependent.
 Red dashed lines represent the CCME freshwater guideline for zinc (0.03 mg/L) and the minimum and maximum site-specific CCME guideline for nickel (0.025 and 0.096 mg/L) based on the hardness (as CaCO₃) range in lakes of 12.5 to 101 mg/L.
 Total nickel and total zinc are regulated as deleterious substances in effluents as per Schedule 4 of the MMER.

Annex A.3-2. Lake Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				Doris South 1 3 25-Apr-2015 L1604660-7	Doris South 1 9 25-Apr-2015 L1604660-8	Doris North 1 3 25-Apr-2015 L1604660-5	Doris North 1 12 25-Apr-2015 L1604660-6	Reference B 1 2.5 24-Apr-2015 L1604660-2	Reference B 1 9 24-Apr-2015 L1604660-4
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	351	356	301	347	75.8	70.6
Hardness (as CaCO ₃)	mg/L		0.50	60.7	62.3	61.1	61	21.4	20.3
pH	pH	6.5 to 9.0	0.10	7.85	7.84	7.81	7.81	7.44	7.37
Total Suspended Solids	mg/L	dependent on background levels	1.0	3.9	3.8	3.9	3.5	<1.0	<1.0
Total Dissolved Solids	mg/L		10	185	190	200	198	45	43
Turbidity	NTU	dependent on background levels	0.10	5.26	5.39	4.66	4.59	1.59	0.28
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	38.3	40.6	38.2	39.8	17.7	15.8
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0056	<0.0050
Bromide (Br)	mg/L		0.050	0.271	0.280	0.273	0.267	<0.050	<0.050
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	81.4	82.8	81.0	80.3	10.2	9.29
Fluoride (F)	mg/L	0.12 ^b	0.020	0.061	0.065	0.063	0.063	0.024	0.022
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0561	0.0654
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.671	0.653	0.670	0.642	0.269	0.316
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0260	0.0237	0.0230	0.0247	0.0104	0.0041
Sulfate (SO ₄)	mg/L		0.30	3.54	3.59	3.51	3.48	2.69	2.55
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	6.65	7.03	6.63	6.82	4.38	3.45
Total Organic Carbon	mg/L		0.50	7.12	6.91	6.61	6.64	3.76	3.05
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0057	0.0064	0.0056	0.0060	0.0101	0.0042
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	0.000031	0.000034	0.000031	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000303	0.000312	0.000328	0.000331	0.000106	0.000087
Barium (Ba)-Total	mg/L		0.00010	0.00290	0.00294	0.00304	0.00291	0.00266	0.00275
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.036	0.038	0.037	0.036	0.010	<0.010
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	10.9	11.2	11.0	11.0	5.21	4.96
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00140	0.00131	0.00140	0.00144	0.00097	0.00105
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	<0.030	<0.030	<0.030	<0.030	<0.030	0.033
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00453	0.00449	0.00450	0.00434	0.00070	0.00066
Magnesium (Mg)-Total	mg/L		0.10	8.13	8.34	8.16	8.17	2.02	1.91
Manganese (Mn)-Total	mg/L		0.00020	0.00463	0.00416	0.00584	0.00568	0.00162	0.00892
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	<0.00050	0.00101	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	0.000176	0.000166	0.000165	0.000157	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00043	0.00046	0.00046	0.00048	0.00025	0.00026
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	2.9	3.0	2.9	2.9	<2.0	<2.0
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00199	0.00199	0.00201	0.00194	0.00123	0.00108
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	1.82	1.86	1.88	1.85	0.164	0.398
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	41.3	42.4	41.4	41.5	5.5	5.1
Strontium (Sr)-Total	mg/L		0.00020	0.0566	0.0574	0.0556	0.0558	0.0254	0.0237
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000053	0.0000056	0.0000054	0.0000055	0.0000057	<0.0000050
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000302	0.0000312	0.0000304	0.0000304	0.0000376	0.0000268
Vanadium (V)-Total	mg/L		0.000050	0.000072	0.000074	0.000071	0.000077	<0.000050	<0.000050
Yttrium (Y)-Total	mg/L		0.0000050	0.0000131	0.0000132	0.0000128	0.0000126	0.0000108	0.0000118
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.166	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{[0.83(log[hardness]) - 2.46]}. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^[0.8545(ln(hardness))-1.465]. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{[(1.273[ln(hardness)]-4.705)]}. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{[0.76[ln(hardness)]+1.06]}. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-2. Lake Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				Little Roberts 1 2.25 24-Apr-2015 L1604660-3	Little Roberts 2 2.25 24-Apr-2015 L1604660-9	Reference D 1 2 23-Apr-2015 L1604660-1	Reference D 2 2 23-Apr-2015 L1604660-10	Doris South 1 1 18-Jul-2015 L1645954-4	Doris South 1 9 18-Jul-2015 L1645954-5
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	536	612	281	295	270	274
Hardness (as CaCO ₃)	mg/L		0.50	98.9	101	57.1	56.2	46.1	47.5
pH	pH	6.5 to 9.0	0.10	7.95	7.94	7.32	7.56	7.83	7.68
Total Suspended Solids	mg/L	dependent on background levels	1.0	3.1	2.3	1.4	1.3	3.0	4.1
Total Dissolved Solids	mg/L		10	327	337	158	170	150	147
Turbidity	NTU	dependent on background levels	0.10	0.27	2.14	2.74	1.59	4.32	4.12
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	54.2	62.3	44.9	44.9	29.6	29.1
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	0.0051	0.0056	0.0065	0.0062	<0.0050	0.0085
Bromide (Br)	mg/L		0.050	0.497	0.500	0.220	0.222	0.208	0.208
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	144	145	61.1	61.0	62.3	62.7
Fluoride (F)	mg/L	0.12 ^b	0.020	0.094	0.094	0.069	0.070	0.050	0.050
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.826	0.649	0.523	0.536	0.486	0.517
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0127
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0221	0.0238	0.0145	0.0144	0.0199	0.0232
Sulfate (SO ₄)	mg/L		0.30	8.48	8.50	4.59	4.57	2.52	2.54
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	10.8	10.6	9.02	8.49	5.97	5.99
Total Organic Carbon	mg/L		0.50	10.3	10.4	8.65	8.60	6.39	6.33
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0085	0.0084	0.0123	0.0114	0.0457	0.0423
Antimony (Sb)-Total	mg/L		0.000030	0.000055	0.000046	0.000049	0.000031	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000543	0.000546	0.000270	0.000253	0.000232	0.000240
Barium (Ba)-Total	mg/L		0.00010	0.00712	0.00709	0.00836	0.00873	0.00293	0.00289
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.060	0.059	0.032	0.036	0.034	0.033
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	15.7	16.0	9.62	9.49	8.12	8.33
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	0.000070	0.000069	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00222	0.00208	0.00150	0.00142	0.00141	0.00115
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.348	0.352	0.870	0.850	0.144	0.157
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000096	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00622	0.00609	0.00344	0.00348	0.00346	0.00332
Magnesium (Mg)-Total	mg/L		0.10	14.5	14.8	8.04	7.88	6.28	6.47
Manganese (Mn)-Total	mg/L		0.00020	0.126	0.124	0.0410	0.0390	0.0140	0.0153
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00050	<0.00050	<0.00050	<0.00050	0.00068	0.00061
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	0.000323	0.000344	0.000064	<0.000050	0.000105	0.000105
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00083	0.00081	0.00084	0.00081	0.00047	0.00048
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	5.0	5.1	3.0	2.9	2.3	2.4
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00435	0.00424	0.00320	0.00315	0.00138	0.00139
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	1.47	1.49	0.780	0.760	1.45	1.49
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000081	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	76.6	79.4	32.9	33.3	30.8	31.6
Strontium (Sr)-Total	mg/L		0.00020	0.0961	0.0956	0.0569	0.0574	0.0520	0.0541
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000130	0.0000138	0.0000172	0.0000162	0.0000154	0.0000149
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00025	0.00048	0.00025	0.00024	0.00133	0.00127
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000599	0.0000622	0.0000250	0.0000242	0.0000262	0.0000260
Vanadium (V)-Total	mg/L		0.000050	0.000116	0.000118	0.000134	0.000129	0.000137	0.000132
Yttrium (Y)-Total	mg/L		0.0000050	0.0000316	0.0000317	0.0000384	0.0000383	0.0000202	0.0000199
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	0.013	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{[0.83(log[hardness]) - 2.46]}. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^[0.8545(ln(hardness))-1.465]. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^[1.273(ln(hardness))-4.705]. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^[0.76(ln(hardness))+1.06]. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-2. Lake Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				Doris North 1 1 18-Jul-2015 L1645954-1	Doris North 1 12 18-Jul-2015 L1645954-2	Reference B 1 1 16-Jul-2015 L1644291-1	Reference B 1 8 16-Jul-2015 L1644291-2	Little Roberts 1 1 15-Jul-2015 L1644328-2	Little Roberts 2 1 15-Jul-2015 L1644328-3
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	274	278	46.8	46.4	244	244
Hardness (as CaCO ₃)	mg/L		0.50	47.2	47.5	12.5	12.6	38.4	37.2
pH	pH	6.5 to 9.0	0.10	7.67	7.61	7.29	7.30	7.65	7.64
Total Suspended Solids	mg/L	dependent on background levels	1.0	3.9	4.7	<1.0	<1.0	2.6	2.2
Total Dissolved Solids	mg/L		10	152	140	22	25	132	122
Turbidity	NTU	dependent on background levels	0.10	4.26	6.44	0.41	0.43	3.41	3.25
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	29.8	29.8	10.2	10.2	25.0	24.9
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		0.050	0.212	0.214	<0.050	<0.050	0.189	0.190
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	62.9	63.5	6.10	6.05	55.6	55.9
Fluoride (F)	mg/L	0.12 ^b	0.020	0.050	0.050	<0.020	<0.020	0.047	0.047
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0109
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.450	0.565	0.160	0.150	0.378	0.380
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0232	0.0278	0.0110	0.0023	0.0151	0.0149
Sulfate (SO ₄)	mg/L		0.30	2.55	2.63	1.59	1.57	3.47	3.40
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	5.92	5.87	2.91	2.51	5.58	5.69
Total Organic Carbon	mg/L		0.50	6.14	6.05	3.02	2.56	5.37	5.73
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0388	0.0696	0.0086	0.0084	0.0915	0.0950
Antimony (Sb)-Total	mg/L		0.000030	0.000031	0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000255	0.000275	0.000066	0.000067	0.000227	0.000234
Barium (Ba)-Total	mg/L		0.00010	0.00302	0.00334	0.00149	0.00153	0.00304	0.00295
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.035	0.034	0.011	<0.010	0.039	0.036
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000063	0.0000075
Calcium (Ca)-Total	mg/L		0.050	8.38	8.44	3.05	3.09	6.03	5.93
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00118	0.00113	0.00160	0.00070	0.00193	0.00425
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.146	0.207	<0.030	0.031	0.158	0.147
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	0.000216	<0.000050	<0.000050	<0.000050	<0.000050	0.000060
Lithium (Li)-Total	mg/L		0.00040	0.00333	0.00361	<0.00040	<0.00040	0.00268	0.00258
Magnesium (Mg)-Total	mg/L		0.10	6.38	6.42	1.19	1.20	5.67	5.43
Manganese (Mn)-Total	mg/L		0.00020	0.0146	0.0305	0.00185	0.00197	0.00882	0.00878
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00068	0.00064	0.00068	0.00068	0.00070	0.00078
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	0.000110	0.000107	<0.000050	<0.000050	0.000136	0.000123
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00048	0.00053	<0.00020	<0.00020	0.00053	0.00049
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	2.4	2.4	<2.0	<2.0	2.0	<2.0
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00149	0.00144	0.000662	0.000681	0.00141	0.00131
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	1.49	1.64	0.095	0.092	0.848	0.860
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	35.0	35.3	3.5	3.5	30.0	28.7
Strontium (Sr)-Total	mg/L		0.00020	0.0562	0.0556	0.0150	0.0149	0.0392	0.0376
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000123	0.0000172	0.0000083	0.0000071	0.0000269	0.0000256
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00109	0.00185	<0.00020	<0.00020	0.00272	0.00217
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000267	0.0000278	0.0000317	0.0000315	0.0000356	0.0000322
Vanadium (V)-Total	mg/L		0.000050	0.000124	0.000185	<0.000050	<0.000050	0.000204	0.000182
Yttrium (Y)-Total	mg/L		0.0000050	0.0000199	0.0000232	0.0000116	0.0000116	0.0000363	0.0000336
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000059	0.000054
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{[0.83(log[hardness]) - 2.46]}. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^[0.8545(ln(hardness))-1.465]. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{[(1.273[ln(hardness)]-4.705)]}. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{[0.76[ln(hardness)]+1.06]}. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-2. Lake Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				Reference D 1 1 16-Jul-2015 L1644333-2	Reference D 2 1 16-Jul-2015 L1644333-1	Doris South 1 1 5-Aug-2015 L1654748-5	Doris South 1 9 5-Aug-2015 L1654748-6	Doris North 1 1 5-Aug-2015 L1654748-2	Doris North 1 12 5-Aug-2015 L1654748-3
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	93.6	93.2	255	274	264	279
Hardness (as CaCO ₃)	mg/L		0.50	17.6	16.9	44.7	48	47.1	48
pH	pH	6.5 to 9.0	0.10	7.24	7.25	7.53	7.61	7.51	7.56
Total Suspended Solids	mg/L	dependent on background levels	1.0	<1.0	<1.0	3.1	5.8	2.3	6.5
Total Dissolved Solids	mg/L		10	50	43	151	160	159	158
Turbidity	NTU	dependent on background levels	0.10	1.14	1.10	3.42	6.56	2.48	7.89
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	11.8	11.8	28.9	29.5	28.9	30.7
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0128
Bromide (Br)	mg/L		0.050	0.055	0.058	0.190	0.206	0.195	0.209
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	19.1	19.1	57.0	61.9	58.5	62.3
Fluoride (F)	mg/L	0.12 ^b	0.020	0.031	0.034	0.051	0.052	0.052	0.053
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	0.0062	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.210	0.194	0.401	0.617	0.373	0.629
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0013
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0033	0.0036	0.0144	0.0425	0.0128	0.0487
Sulfate (SO ₄)	mg/L		0.30	1.75	1.75	2.42	2.66	2.51	2.65
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	4.11	4.37	6.54	5.56	6.07	5.67
Total Organic Carbon	mg/L		0.50	4.13	3.99	7.00	5.69	6.07	5.91
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0619	0.0647	0.0951	0.0482	0.0583	0.0970
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	0.000039	0.000035	0.000041	0.000038
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000109	0.000102	0.000268	0.000249	0.000245	0.000369
Barium (Ba)-Total	mg/L		0.00010	0.00204	0.00187	0.00353	0.00341	0.00327	0.00425
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.016	0.014	0.028	0.031	0.030	0.031
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	0.0000098	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	2.82	2.72	8.02	8.64	8.48	8.62
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	0.000078
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00142	0.00113	0.00160	0.00147	0.00155	0.00120
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.083	0.079	0.123	0.127	0.096	0.368
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	0.000229	0.000680	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00122	0.00115	0.00295	0.00316	0.00300	0.00305
Magnesium (Mg)-Total	mg/L		0.10	2.57	2.46	5.99	6.42	6.30	6.43
Manganese (Mn)-Total	mg/L		0.00020	0.00265	0.00262	0.0100	0.0202	0.00786	0.0794
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00077	0.00075	0.00081	0.00072	0.00071	0.00085
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	0.000053	<0.000050	0.000145	0.000144	0.000140	0.000162
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00034	0.00035	0.00055	0.00065	0.00045	0.00071
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	<2.0	<2.0	2.1	2.3	2.2	2.4
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00116	0.00110	0.00139	0.00142	0.00139	0.00148
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	0.259	0.246	1.53	1.58	1.51	1.77
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	10.8	10.4	29.0	31.8	30.8	31.8
Strontium (Sr)-Total	mg/L		0.00020	0.0182	0.0176	0.0377	0.0408	0.0394	0.0412
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000240	0.0000247	0.0000360	0.0000203	0.0000233	0.0000271
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00164	0.00154	0.00219	0.00136	0.00167	0.00280
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000257	0.0000253	0.0000361	0.0000310	0.0000358	0.0000358
Vanadium (V)-Total	mg/L		0.000050	0.000104	0.000100	0.000188	0.000142	0.000142	0.000284
Yttrium (Y)-Total	mg/L		0.0000050	0.0000268	0.0000274	0.0000415	0.0000250	0.0000316	0.0000389
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000071	<0.000050	0.000052	0.000057
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	0.013	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{[0.83(log[hardness]) - 2.46]}. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^[0.8545(ln(hardness))-1.465]. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{[(1.273[ln(hardness)]-4.705)]}. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{[0.76[ln(hardness)]+1.06]}. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-2. Lake Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				Reference B 1 1 11-Aug-2015 L1658082-1	Reference B 1 8 11-Aug-2015 L1658082-2	Little Roberts 1 1 10-Aug-2015 L1656611-3	Little Roberts 2 1 10-Aug-2015 L1656611-4	Reference D 1 1 9-Aug-2015 L1656611-1	Reference D 2 1 9-Aug-2015 L1656611-2
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	47.9	47.4	254	256	98.7	98.7
Hardness (as CaCO ₃)	mg/L		0.50	13.2	13.4	43	44.3	19.1	19.1
pH	pH	6.5 to 9.0	0.10	7.28	7.26	7.58	7.58	7.26	7.27
Total Suspended Solids	mg/L	dependent on background levels	1.0	<1.0	<1.0	3.8	3.3	<1.0	<1.0
Total Dissolved Solids	mg/L		10	30	31	149	158	61	59
Turbidity	NTU	dependent on background levels	0.10	0.40	0.34	3.94	4.11	0.91	1.09
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	10.6	10.2	28.2	28.1	12.9	13.3
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	<0.0050	0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		0.050	<0.050	<0.050	0.185	0.187	0.058	0.052
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	6.08	6.07	56.6	56.5	19.2	19.2
Fluoride (F)	mg/L	0.12 ^b	0.020	<0.020	<0.020	0.049	0.049	0.034	0.033
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.189	0.198	0.453	0.437	0.288	0.295
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0042	0.0020	0.0145	0.0162	0.0051	0.0069
Sulfate (SO ₄)	mg/L		0.30	1.47	1.47	3.35	3.35	1.77	1.77
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	2.89	2.71	6.46	6.32	5.07	5.16
Total Organic Carbon	mg/L		0.50	3.01	2.97	6.38	6.24	4.81	4.86
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0086	0.0096	0.118	0.118	0.0488	0.0482
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	0.000034	0.000034	0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000081	0.000078	0.000290	0.000300	0.000117	0.000133
Barium (Ba)-Total	mg/L		0.00010	0.00139	0.00142	0.00358	0.00356	0.00198	0.00194
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	<0.010	<0.010	0.029	0.033	0.014	0.017
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	3.21	3.26	7.28	7.46	3.06	3.06
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	0.0000058	0.0000055	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000066	0.000072	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00076	0.00072	0.00143	0.00158	0.00111	0.00115
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.031	0.031	0.223	0.230	0.124	0.125
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	<0.000050	0.000262	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00052	0.00050	0.00271	0.00273	0.00108	0.00111
Magnesium (Mg)-Total	mg/L		0.10	1.26	1.28	6.04	6.24	2.78	2.79
Manganese (Mn)-Total	mg/L		0.00020	0.00152	0.00158	0.0151	0.0154	0.00562	0.00587
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00060	0.00059	0.00072	0.00071	0.00078	0.00077
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	<0.000050	<0.000050	0.000183	0.000189	0.000071	0.000067
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	<0.00020	<0.00020	0.00057	0.00062	0.00044	0.00045
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	<2.0	<2.0	2.2	2.3	<2.0	<2.0
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.000650	0.000674	0.00141	0.00143	0.00103	0.00104
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	0.107	0.111	1.22	1.24	0.347	0.351
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	3.7	3.8	31.4	32.7	11.8	11.8
Strontium (Sr)-Total	mg/L		0.00020	0.0151	0.0146	0.0381	0.0383	0.0175	0.0175
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000058	0.0000064	0.0000450	0.0000472	0.0000374	0.0000415
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	<0.00020	<0.00020	0.00336	0.00330	0.00108	0.00104
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000415	0.0000422	0.0000412	0.0000422	0.0000384	0.0000377
Vanadium (V)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000238	0.000235	0.000093	0.000102
Yttrium (Y)-Total	mg/L		0.0000050	0.0000145	0.0000153	0.0000529	0.0000546	0.0000475	0.0000493
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000072	0.000071	0.000061	0.000060
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{[0.83(log[hardness]) - 2.46]}. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^[0.8545(ln(hardness))-1.465]. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{[(1.273[ln(hardness)]-4.705)]}. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{[0.76[ln(hardness)]+1.06]}. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-2. Lake Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				Doris South 1 1 17-Sep-2015 L1675358-1	Doris South 1 9 17-Sep-2015 L1675358-2	Doris North 1 1 17-Sep-2015 L1675358-3	Doris North 1 12 17-Sep-2015 L1675358-4	Reference B 1 1 18-Sep-2015 L1676833-7	Reference B 2 1 18-Sep-2015 L1676833-6
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	266	265	267	268	50.3	48.6
Hardness (as CaCO ₃)	mg/L		0.50	46.7	44.5	46.3	46.9	14.6	14.5
pH	pH	6.5 to 9.0	0.10	7.63	7.71	7.70	7.67	7.17	7.16
Total Suspended Solids	mg/L	dependent on background levels	1.0	5.6	6.0	5.3	5.9	<1.0	<1.0
Total Dissolved Solids	mg/L		10	167	148	168	153	33	34
Turbidity	NTU	dependent on background levels	0.10	6.48	6.35	6.26	6.70	0.51	0.54
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	30.3	30.9	30.7	30.7	11.3	11.1
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		0.050	0.200	0.211	0.205	0.196	<0.050	<0.050
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	60.5	60.4	60.7	60.4	6.76	6.46
Fluoride (F)	mg/L	0.12 ^b	0.020	0.051	0.051	0.051	0.050	<0.020	<0.020
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.584	0.612	0.572	0.588	0.182	0.194
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0213	0.0221	0.0292	0.0189	0.0042	0.0045
Sulfate (SO ₄)	mg/L		0.30	2.31	2.30	2.34	2.33	1.64	1.63
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	6.03	6.02	6.00	5.90	3.19	3.03
Total Organic Carbon	mg/L		0.50	6.31	6.39	6.20	6.18	2.92	3.03
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0928	0.0945	0.0878	0.0802	0.0170	0.0097
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000332	0.000318	0.000324	0.000325	0.000095	0.000097
Barium (Ba)-Total	mg/L		0.00010	0.00382	0.00336	0.00368	0.00357	0.00168	0.00157
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.041	0.037	0.037	0.039	0.014	0.013
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	8.34	7.94	8.28	8.44	3.57	3.59
Cesium (Cs)-Total	mg/L		0.0000050	0.0000070	0.0000068	0.0000069	0.0000063	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	0.00063	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	0.000062	0.000052	0.000054	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00166	0.00133	0.00159	0.00134	0.00079	0.00076
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.157	0.162	0.140	0.135	<0.030	<0.030
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	0.000113	<0.000050	0.000187	0.00122	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00315	0.00295	0.00320	0.00327	0.00092	0.00089
Magnesium (Mg)-Total	mg/L		0.10	6.30	5.98	6.22	6.27	1.39	1.34
Manganese (Mn)-Total	mg/L		0.00020	0.0212	0.0193	0.0205	0.0204	0.00144	0.00131
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	0.00056	0.00057	0.00057	0.00053	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	0.000205	0.000174	0.000198	0.000174	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	0.00099	0.00059	0.00066	0.00060	0.00021	<0.00020
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	2.4	2.3	2.4	2.4	<2.0	<2.0
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.00155	0.00143	0.00152	0.00150	0.000793	0.000770
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	1.60	1.51	1.58	1.58	0.118	0.114
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	32.2	30.9	32.2	32.5	4.0	3.8
Strontium (Sr)-Total	mg/L		0.00020	0.0419	0.0392	0.0423	0.0420	0.0170	0.0181
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000304	0.0000298	0.0000309	0.0000290	0.0000092	0.0000100
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00288	0.00316	0.00247	0.00229	0.00025	0.00026
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000357	0.0000357	0.0000362	0.0000363	0.0000421	0.0000437
Vanadium (V)-Total	mg/L		0.000050	0.000224	0.000228	0.000215	0.000207	<0.000050	<0.000050
Yttrium (Y)-Total	mg/L		0.0000050	0.0000300	0.0000297	0.0000296	0.0000274	0.0000136	0.0000133
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L		0.010	0.01	<0.0100	<0.0100	<0.0100	0.011	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{[0.83(log[hardness]) - 2.46]}. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^[0.8545(ln(hardness))-1.465]. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{[(1.273[ln(hardness)]-4.705)]}. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{[0.76[ln(hardness)]+1.06]}. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Annex A.3-2. Lake Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				Reference B 1 8 18-Sep-2015 L1676833-8	Little Roberts 1 1 19-Sep-2015 L1676833-1	Little Roberts 2 1 19-Sep-2015 L1676833-2	Reference D 1 1 19-Sep-2015 L1676833-3	Reference D 2 1 19-Sep-2015 L1676833-4	Reference D 3 1 19-Sep-2015 L1676833-5
	Units	CCME Guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Conductivity	uS/cm		2.0	52.9	268	270	99.1	99.1	99.6
Hardness (as CaCO ₃)	mg/L		0.50	21.8	44.3	44.1	18.7	19.5	19.3
pH	pH	6.5 to 9.0	0.10	7.21	7.54	7.56	7.19	7.19	7.18
Total Suspended Solids	mg/L	dependent on background levels	1.0	<1.0	4.1	4.1	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L		10	35	161	156	68	67	69
Turbidity	NTU	dependent on background levels	0.10	0.57	4.43	5.21	1.25	1.05	1.23
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		1.0	11.1	29.1	29.0	12.5	13.2	12.8
Ammonia, Total (as N)	mg/L	pH- and temperature-dependent	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		0.050	<0.050	0.198	0.196	0.064	0.061	0.057
Chloride (Cl)	mg/L	short-term: 640; long-term: 120	0.50	6.46	59.4	59.6	20.2	20.2	20.2
Fluoride (F)	mg/L	0.12 ^b	0.020	<0.020	0.049	0.049	0.034	0.034	0.034
Nitrate (as N)	mg/L	short-term: 124; long-term: 3.0	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L		0.050	0.184	0.501	0.459	0.237	0.251	0.241
Orthophosphate-Dissolved (as P)	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	Trigger ranges from guidance framework ^c	0.0020	0.0037	0.0225	0.0213	0.0064	0.0064	0.0061
Sulfate (SO ₄)	mg/L		0.30	1.63	3.66	3.64	1.92	1.92	1.92
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	0.005	0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	1.87	5.98	5.86	4.83	4.80	4.80
Total Organic Carbon	mg/L		0.50	2.88	6.05	6.84	4.58	5.03	4.37
Total Metals									
Aluminum (Al)-Total	mg/L	0.005 if pH<6.5; 0.1 if pH≥6.5	0.0030	0.0100	0.0870	0.0858	0.0612	0.0605	0.0585
Antimony (Sb)-Total	mg/L		0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	0.005	0.000050	0.000086	0.000292	0.000279	0.000129	0.000128	0.000135
Barium (Ba)-Total	mg/L		0.00010	0.00166	0.00321	0.00329	0.00209	0.00210	0.00198
Beryllium (Be)-Total	mg/L		0.0000050	<0.0000050	0.0000058	0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	short-term: 29; long-term: 1.5	0.010	0.012	0.036	0.035	0.020	0.019	0.021
Cadmium (Cd)-Total	mg/L	long-term: 0.00004-0.00037 ^d	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L		0.050	6.50	7.43	7.40	2.98	3.13	3.12
Cesium (Cs)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.001; Cr(III): 0.0089 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	0.000050	0.000052	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.002-0.004 ^e	0.00050	0.00088	0.00138	0.00131	0.00115	0.00103	0.00110
Gallium (Ga)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	0.3	0.030	0.034	0.164	0.167	0.088	0.096	0.085
Lead (Pb)-Total	mg/L	0.001-0.007 ^f	0.000050	0.000358	<0.000050	0.000057	0.000451	0.000080	<0.000050
Lithium (Li)-Total	mg/L		0.00040	0.00082	0.00282	0.00287	0.00143	0.00151	0.00158
Magnesium (Mg)-Total	mg/L		0.10	1.36	6.26	6.23	2.73	2.84	2.80
Manganese (Mn)-Total	mg/L		0.00020	0.00157	0.0119	0.0126	0.00380	0.00396	0.00395
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.026	0.00050	<0.00050	0.00051	0.00055	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L	0.073 ^b	0.000050	<0.000050	0.000164	0.000165	0.000058	0.000064	0.000084
Nickel (Ni)-Total	mg/L	0.025-0.150 ^g	0.00020	<0.00020	0.00055	0.00055	0.00042	0.00044	0.00043
Phosphorus (P)-Total	mg/L		0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L		2.0	<2.0	2.1	2.1	<2.0	<2.0	<2.0
Rhenium (Re)-Total	mg/L		0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L		0.000020	0.000783	0.00143	0.00143	0.00109	0.00113	0.00112
Selenium (Se)-Total	mg/L	0.001	0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L		0.050	0.111	1.02	1.03	0.310	0.330	0.314
Silver (Ag)-Total	mg/L	long-term : 0.00025	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L		2.0	3.8	30.7	30.2	10.9	11.3	11.6
Strontium (Sr)-Total	mg/L		0.00020	0.0181	0.0398	0.0389	0.0180	0.0184	0.0186
Tellurium (Te)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	0.0008	0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L		0.0000050	0.0000101	0.0000284	0.0000273	0.0000344	0.0000369	0.0000372
Tin (Sn)-Total	mg/L		0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L		0.00020	0.00026	0.00220	0.00220	0.00153	0.00163	0.00150
Tungsten (W)-Total	mg/L		0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	short-term: 0.033; long-term: 0.015	0.0000020	0.0000431	0.0000393	0.0000374	0.0000378	0.0000389	0.0000384
Vanadium (V)-Total	mg/L		0.000050	<0.000050	0.000180	0.000182	0.000115	0.000116	0.000124
Yttrium (Y)-Total	mg/L		0.0000050	0.0000221	0.0000335	0.0000326	0.0000353	0.0000362	0.0000355
Zinc (Zn)-Total	mg/L	0.03	0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	0.01	<0.0100	<0.0100	0.012	<0.0100

Notes:

Shaded cells indicate values that are both above analytical detection limits and exceed CCME guidelines for the protection of freshwater aquatic life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of freshwater aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

^c Total phosphorus trigger ranges for lakes and rivers (mg/L): <0.004 = Ultra-oligotrophic; 0.004–0.01 = Oligotrophic; 0.01–0.02 = Mesotrophic; 0.02–0.035 = Meso-eutrophic; 0.035–0.1 = Eutrophic; >0.1 = Hyper-eutrophic.

^d Cadmium guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <17 mg/L, the CWQG is 0.00004 mg/L. At hardness ≥ 17 to ≤ 280 mg/L, the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*10^{[0.83(log[hardness]) - 2.46]}. At hardness > 280 mg/L, the CWQG is 0.00037 mg/L.

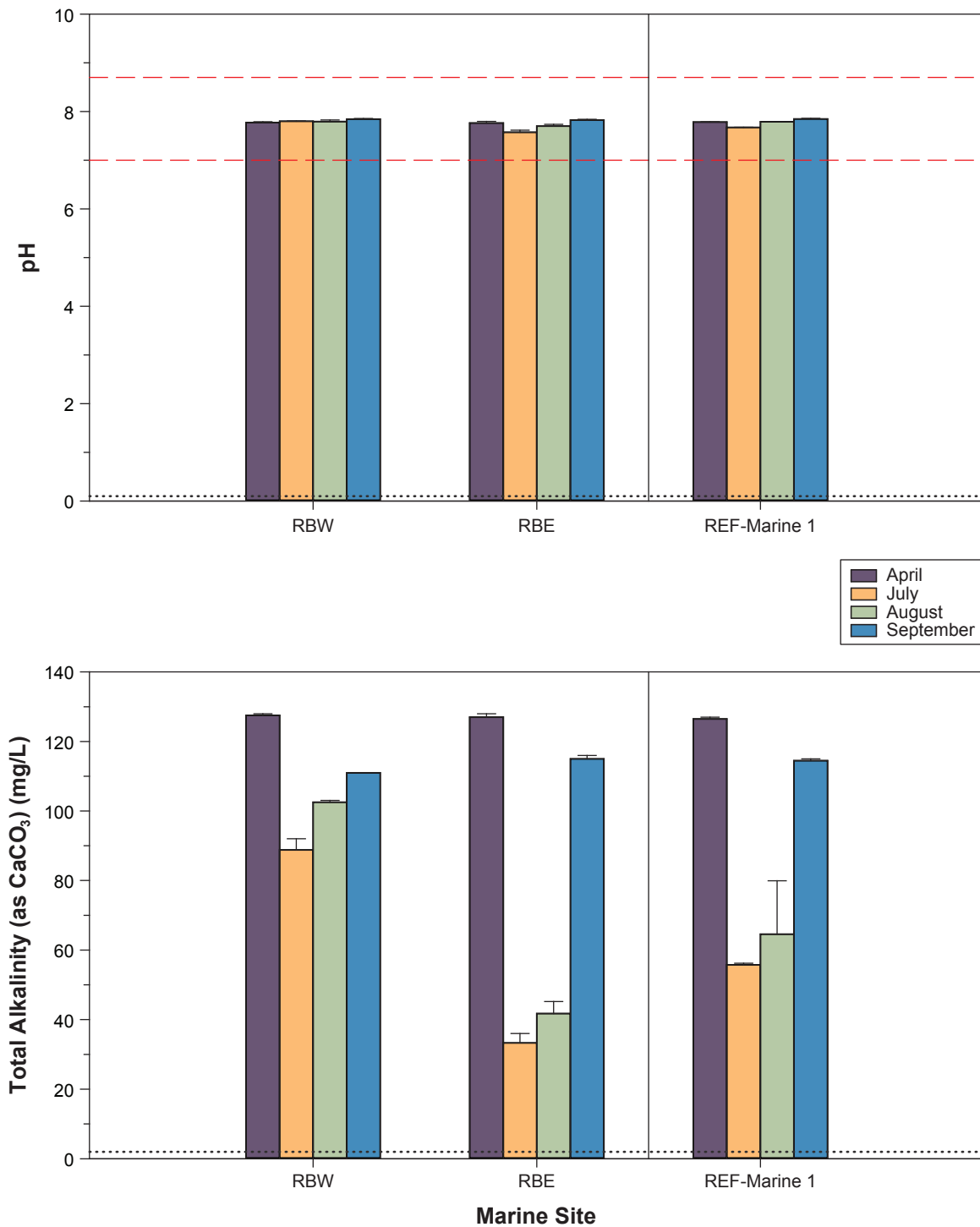
^e Copper guideline is hardness dependent (hardness as CaCO₃). When the water hardness is <82 mg/L, the CWQG is 0.002 mg/L. At hardness ≥82 to ≤180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.0002 * e^[0.8545(ln(hardness))-1.465]. At hardness >180 mg/L, the CWQG is 0.004 mg/L. If the hardness is unknown, the CWQG is 0.002 mg/L.

^f Lead guideline is hardness dependent (hardness as CaCO₃). When the hardness is 0 to ≤ 60 mg/L, the CWQG is 0.001 mg/L. At hardness >60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L)= 0.001*e^{[(1.273[ln(hardness)]-4.705)]}. At hardness >180 mg/L, the CWQG is 0.007 mg/L. If the hardness is unknown, the CWQG is 0.001 mg/L.

^g Nickel guideline is hardness dependent (hardness as CaCO₃). When the water hardness is 0 to ≤ 60 mg/L, the CWQG is 0.025 mg/L. At hardness > 60 to ≤ 180 mg/L the CWQG is calculated using this equation: CWQG (mg/L) = 0.001*e^{[0.76[ln(hardness)]+1.06]}. At hardness >180 mg/L, the CWQG is 0.150 mg/L. If the hardness is unknown, the CWQG is 0.025 mg/L.

Figure A.3-19

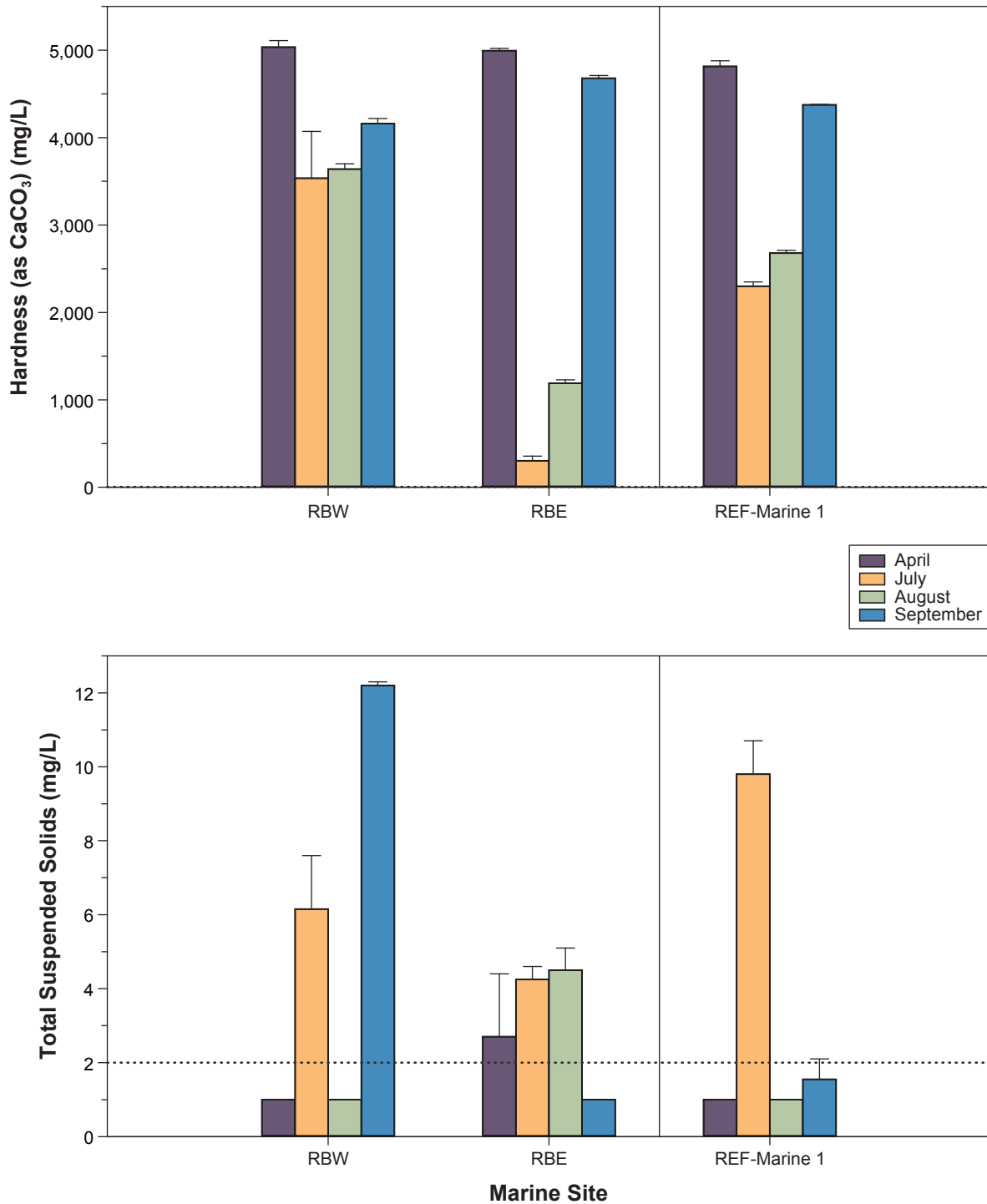
pH and Total Alkalinity in Marine Sites,
Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits.
 Red dashed lines represent the CCME marine and estuarine guideline pH range (7.0–8.7).
 pH is a required parameter for water quality monitoring as per Schedule 5, s. 7(1)(c) of the MMER.
 Total alkalinity is a required parameter for effluent characterization and water quality monitoring as per Schedule 5, s. 4(1) and s. 7(1)(c) of the MMER.

Figure A.3-20

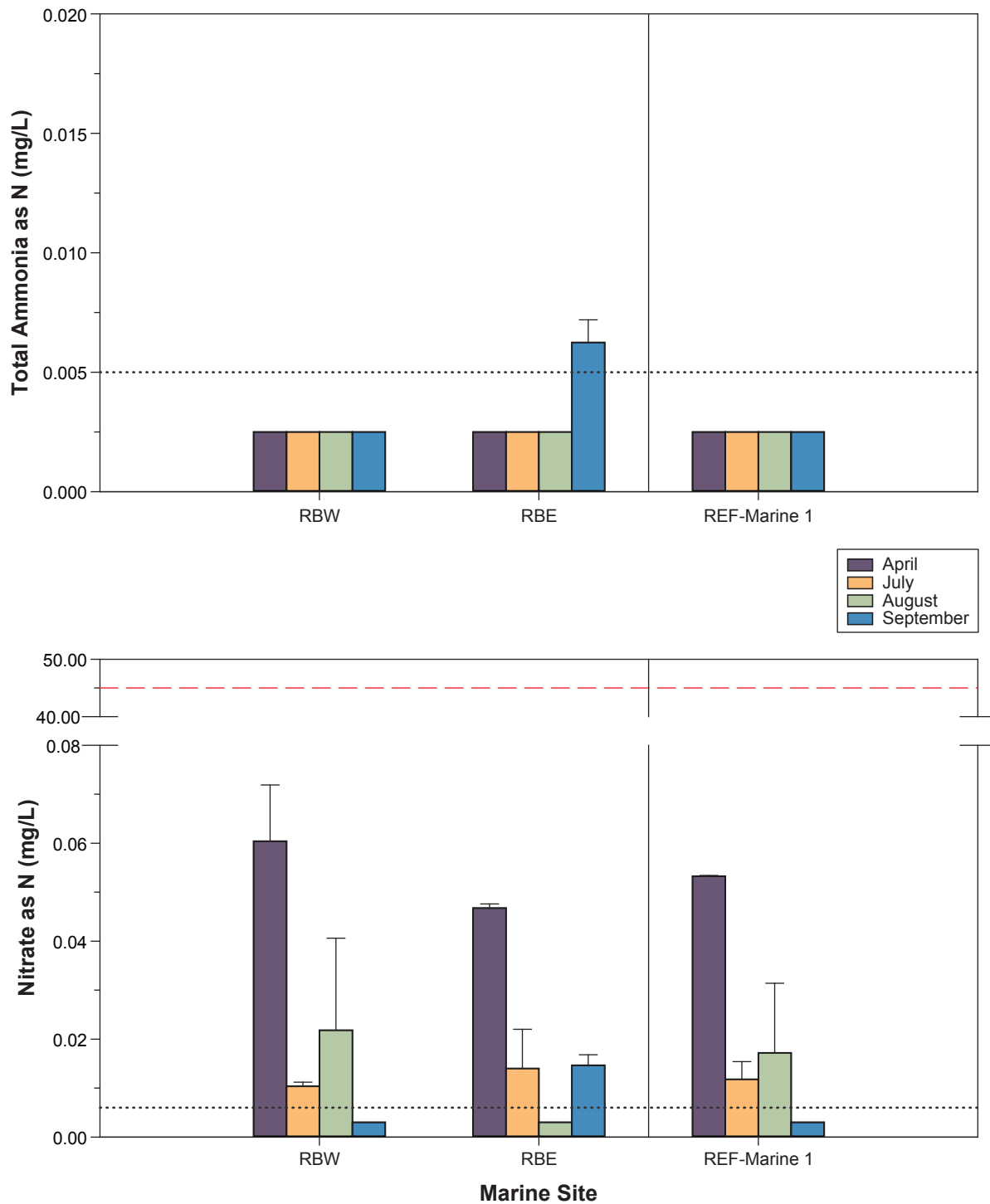
Hardness and Total Suspended Solids
in Marine Sites, Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 The CCME marine guideline for total suspended solids is dependent upon background levels.
 Hardness is a required parameter for effluent characterization and water quality monitoring as per Schedule 5, s. 4(1) and s. 7(1)(c) of the MMER.
 Total suspended solids are regulated as deleterious substances in effluents as per Schedule 4 of the MMER.

Figure A.3-21

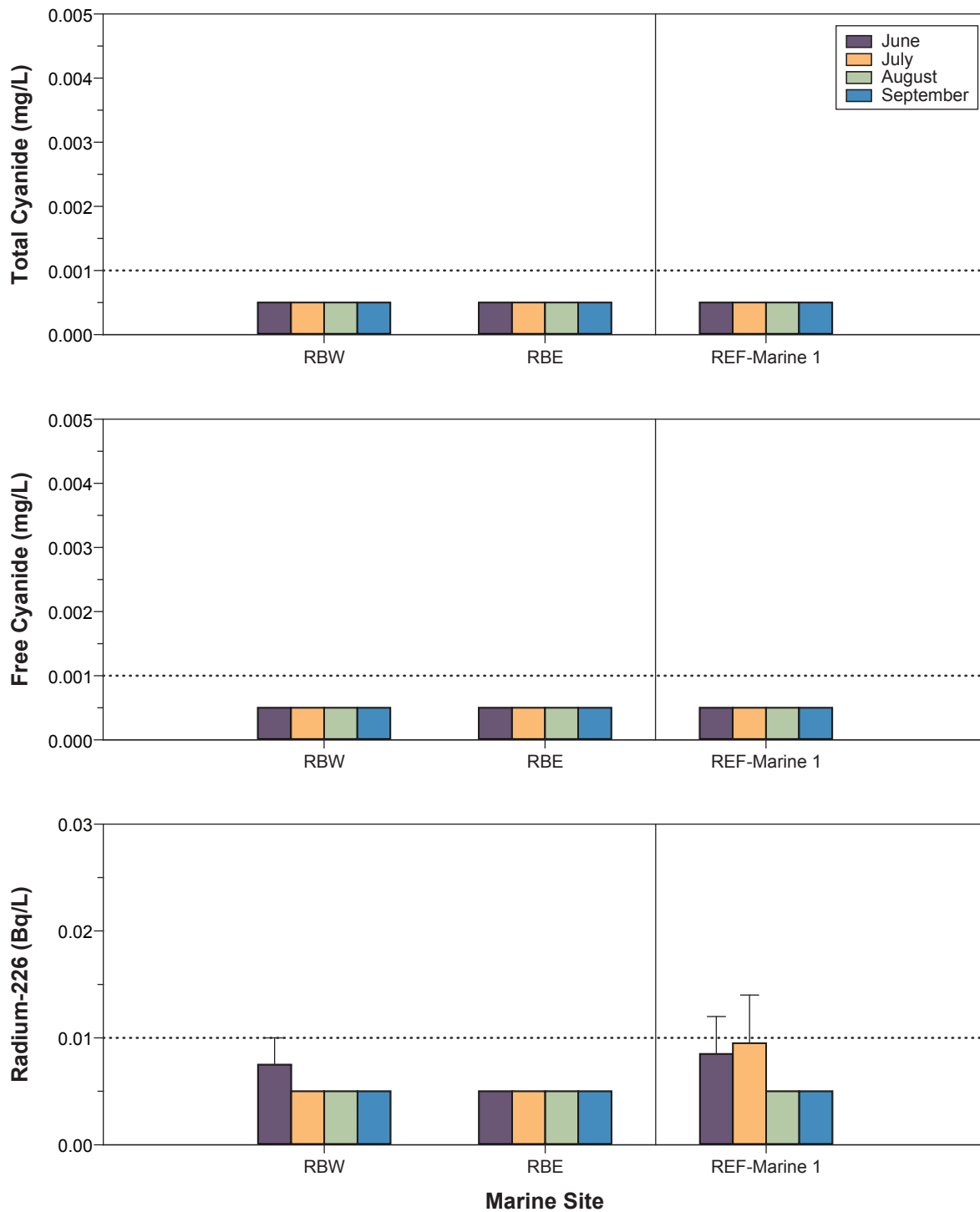
**Total Ammonia and Nitrate Concentrations
in Marine Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Red dashed line represents the CCME marine guideline for nitrate as N (45 mg/L; long-term concentration).
 Total ammonia and nitrate are required parameters for effluent characterization as per Schedule 5, s. 4(1) of the MMER.

Figure A.3-22

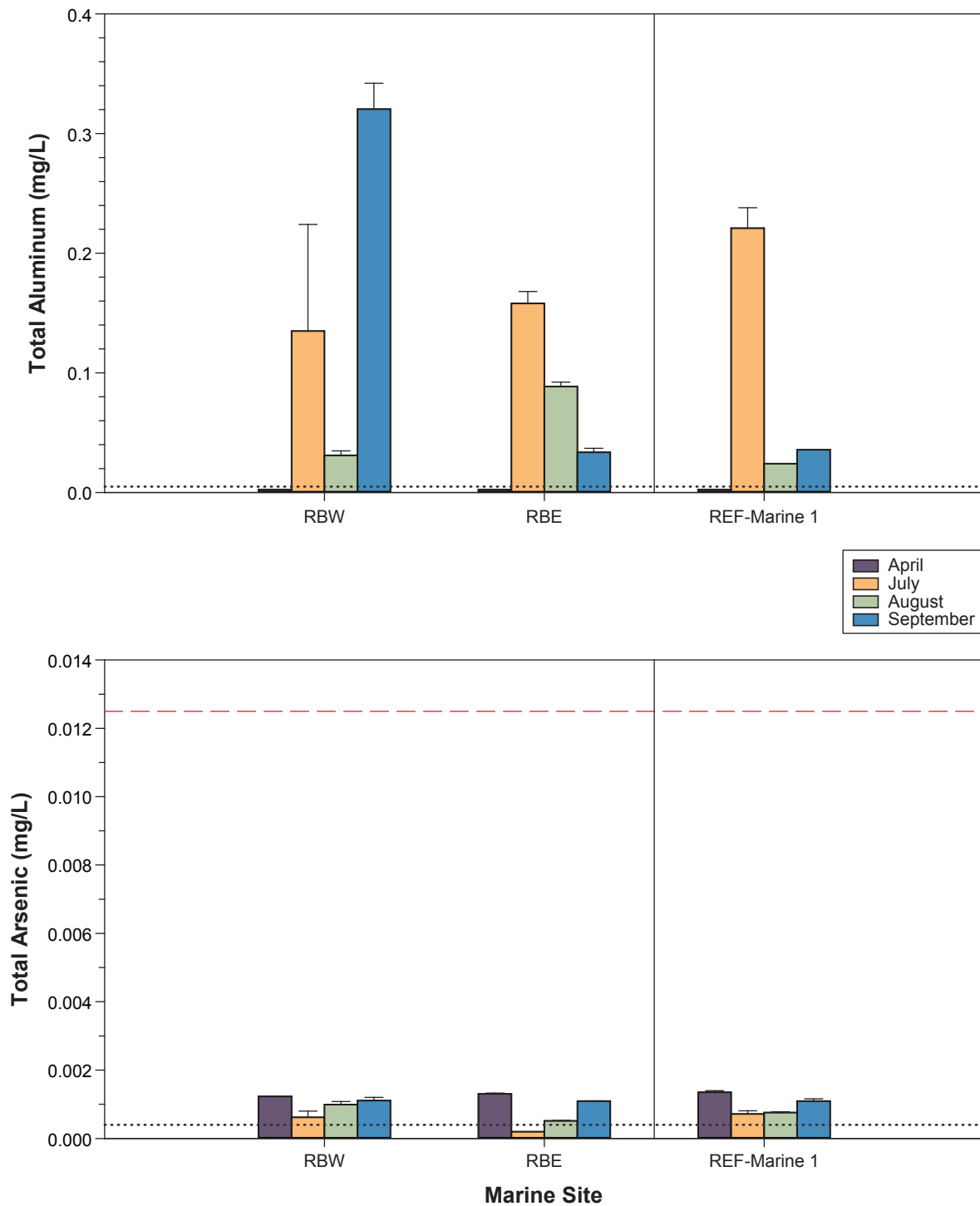
**Total Cyanide, Free Cyanide, and Radium-226
Concentrations in Marine Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 All total cyanide and free cyanide concentrations in marine samples were below the detection limit.
 Total cyanide and radium-226 are regulated as deleterious substances in effluents as per Schedule 4 of the MMER.

Figure A.3-23

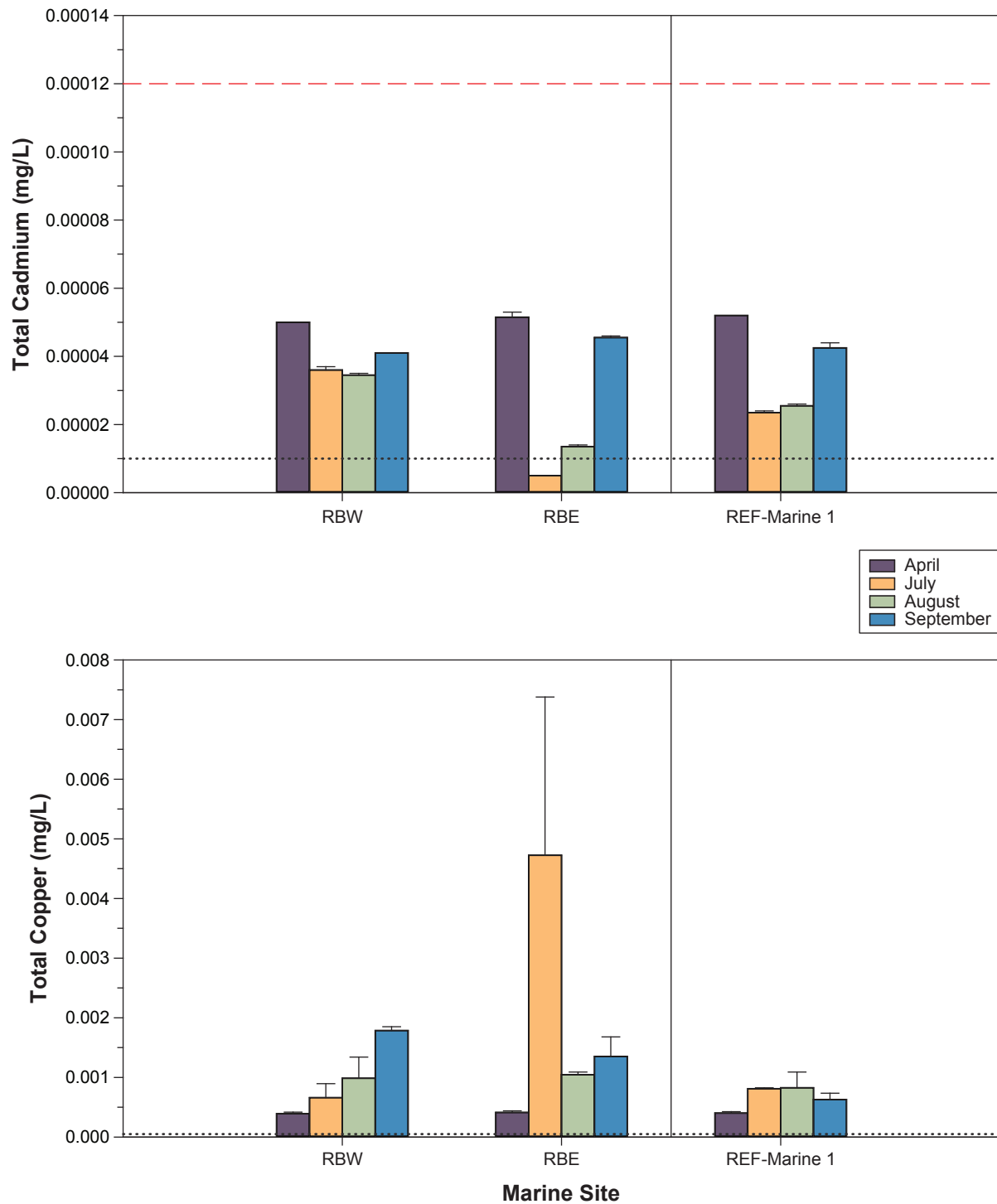
**Total Aluminum and Total Arsenic Concentrations
in Marine Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Red dashed line represents the interim CCME marine guideline for arsenic (0.0125 mg/L).
 Total aluminum is a required parameter for effluent characterization as per Schedule 5, s. 4(1) of the MMER.
 Total arsenic is regulated as a deleterious substance in effluents as per Schedule 4 of the MMER.

Figure A.3-24

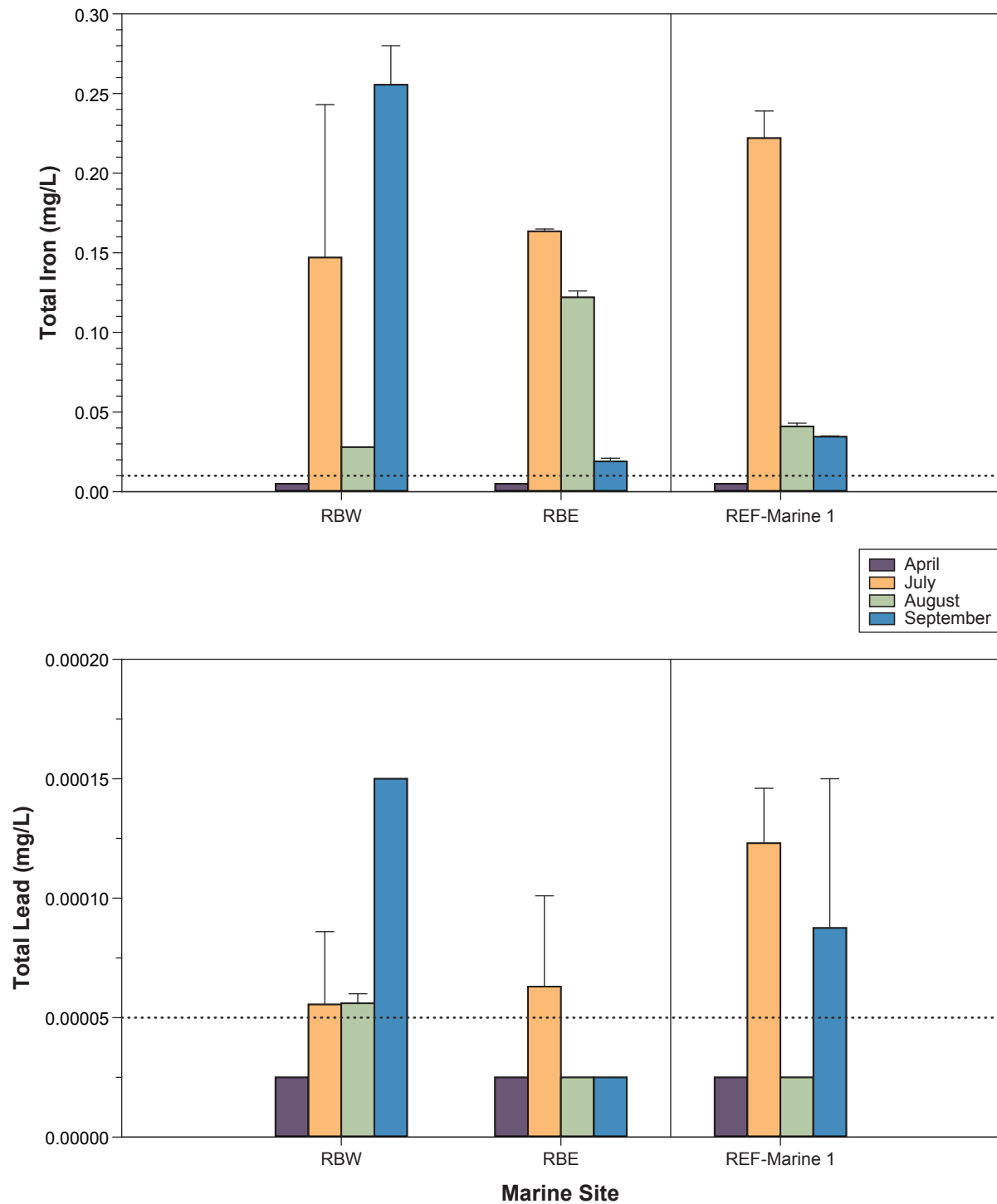
**Total Cadmium and Total Copper Concentrations
in Marine Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Red dashed line represents the CCME marine guideline for cadmium (0.00012 mg/L).
 Total cadmium is a required parameter for effluent characterization as per Schedule 5, s. 4(1) of the MMER.
 Total copper is regulated as a deleterious substance in effluents as per Schedule 4 of the MMER.

Figure A.3-25

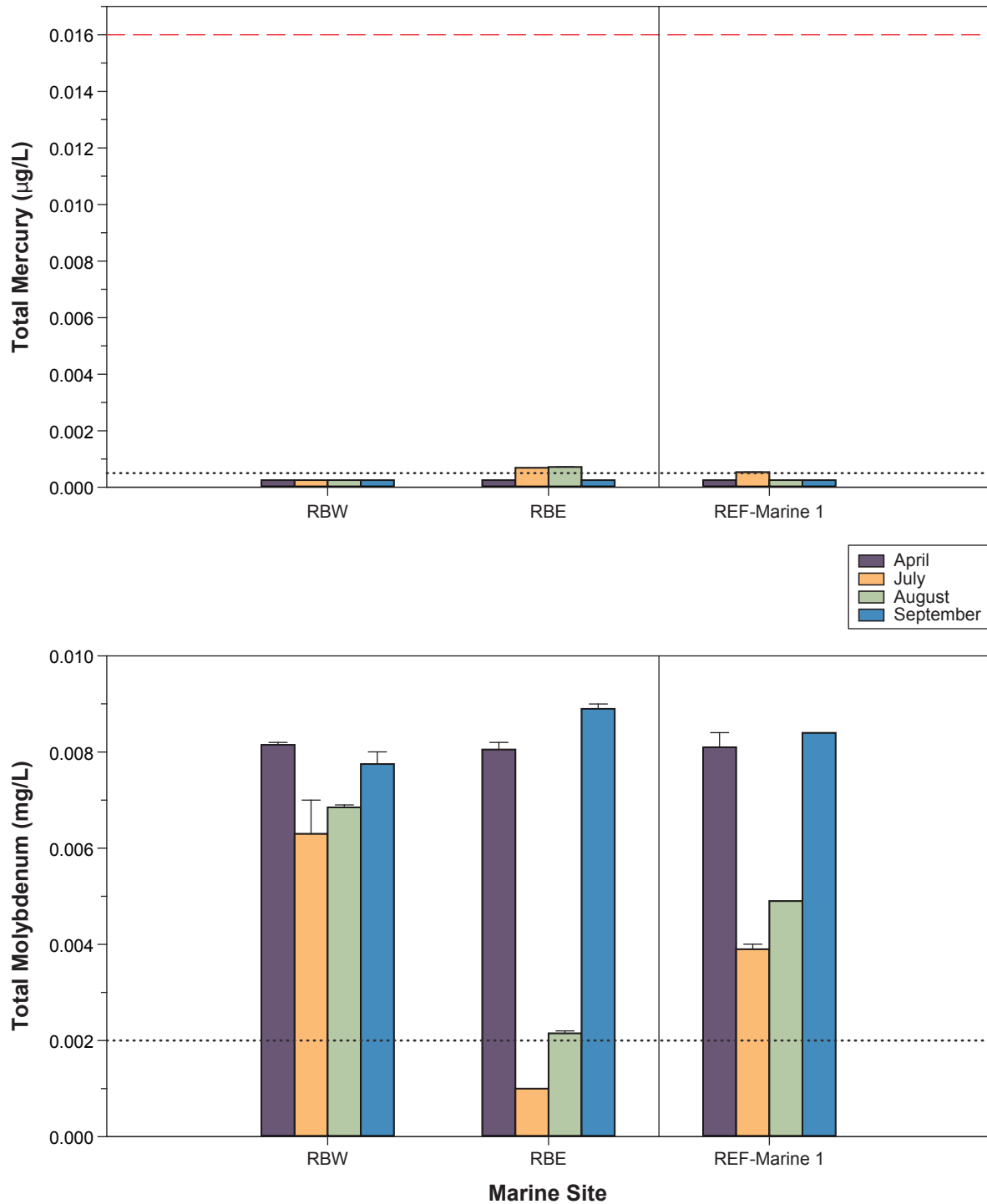
**Total Iron and Total Lead Concentrations
in Marine Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Total iron is a required parameter for effluent characterization as per Schedule 5, s. 4(1) of the MMER.
 Total lead is regulated as a deleterious substance in effluents as per Schedule 4 of the MMER.

Figure A.3-26

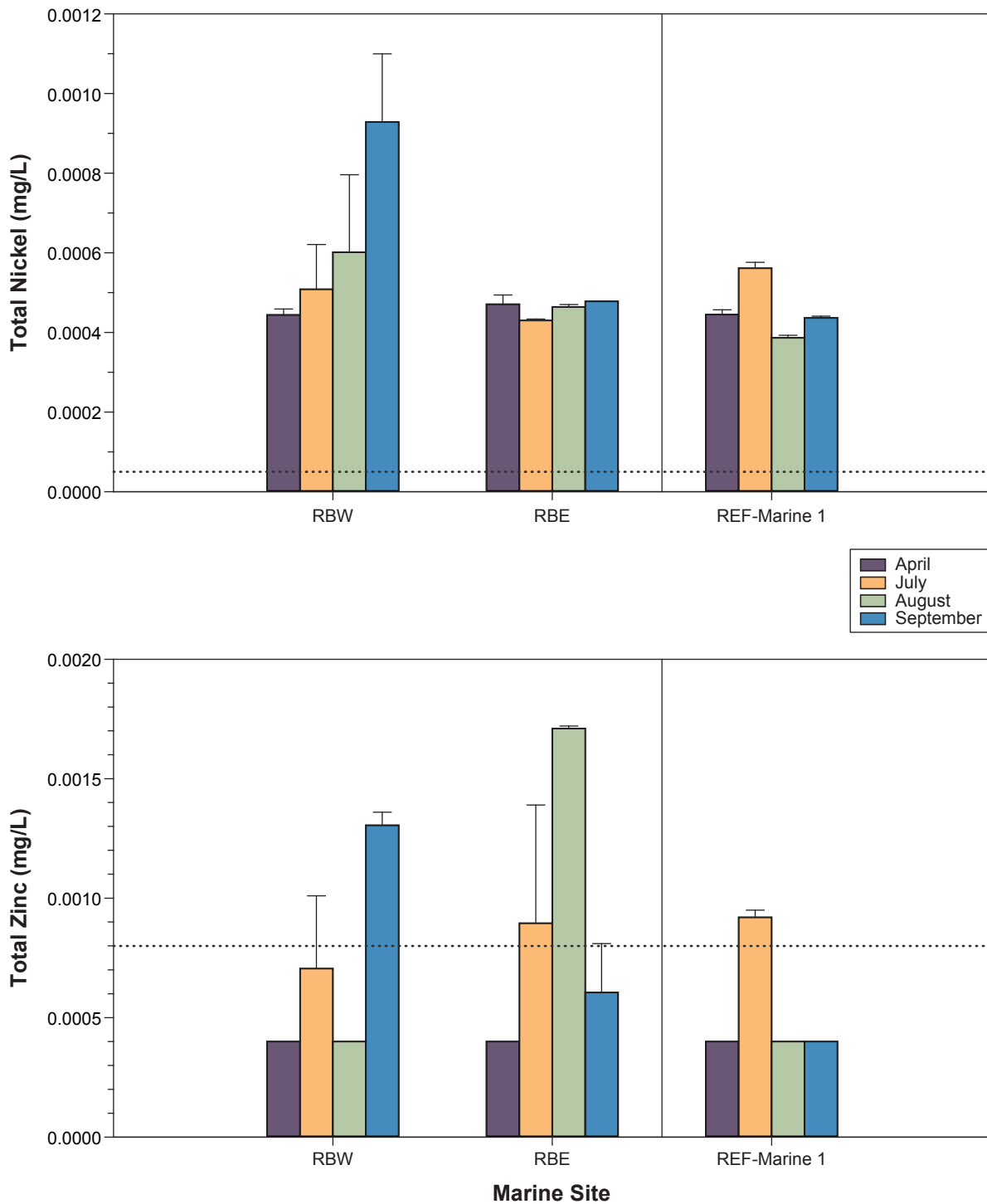
Total Mercury, Methylmercury, and Total Molybdenum Concentrations in Marine Sites, Doris North Project, 2015



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Red dashed line represents the interim CCME marine guideline for inorganic mercury (0.016 µg/L).
 Total mercury and total molybdenum are required parameters for effluent characterization as per Schedule 5, s. 4(1) of the MMR.

Figure A.3-27

**Total Nickel and Total Zinc Concentrations
in Marine Sites, Doris North Project, 2015**



Notes: Error bars represent the standard error of the mean of replicates.
 Black dotted lines represent the analytical detection limits; values below the detection limit are plotted at half the applicable detection limit.
 Total nickel and total zinc are regulated as deleterious substances in effluents as per Schedule 4 of the MMER.

Annex A.3-3. Marine Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				RBW 1 3 23-Apr-15 L1604607-1	RBW 2 3 23-Apr-15 L1604607-2	RBE 1 2 23-Apr-15 L1604607-3	RBE 2 2 23-Apr-15 L1604607-4	REF-Marine 1 1 3 23-Apr-15 L1604607-5	REF-Marine 1 2 3 23-Apr-15 L1604607-6
	Units	CCME guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Hardness (as CaCO ₃)	mg/L		4.3	5110	4960	5020	4970	4880	4750
pH	pH	7.0 to 8.7	0.10	7.76	7.79	7.73	7.80	7.79	7.78
Salinity	psu	dependent on background levels ^b	1.0	27.1	27.0	27.0	27.0	27.0	27.0
Total Suspended Solids	mg/L	dependent on background levels	2.0	<2.0	<2.0	4.4	<2.0	<2.0	<2.0
Total Dissolved Solids	mg/L		80	28500	30200	30500	27400	27300	29200
Turbidity	NTU	dependent on background levels	0.10	0.27	0.31	0.65	0.22	0.23	0.24
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		2.0	128	127	128	126	126	127
Ammonia, Total (as N)	mg/L		0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		5.0	52.5	50.3	53.4	48.9	54.5	49.5
Chloride (Cl)	mg/L		50	15100	14500	15400	14000	15700	14200
Fluoride (F)	mg/L		0.4 to 2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nitrate and Nitrite (as N)	mg/L		0.0060	0.0719	0.0489	0.0476	0.0459	0.0534	0.0531
Nitrate (as N)	mg/L	short-term: 339; long-term: 45	0.0060	0.0719	0.0489	0.0476	0.0459	0.0534	0.0531
Nitrite (as N)	mg/L		0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Kjeldahl Nitrogen	mg/L		0.050	0.238	0.136	0.121	0.121	0.095	0.114
Orthophosphate-Dissolved (as P)	mg/L		0.0010	0.0388	0.0353	0.0382	0.0336	0.0374	0.0386
Phosphorus (P)-Total	mg/L		0.010	0.045	0.045	0.049	0.050	0.050	0.050
Sulfate (SO ₄)	mg/L		50	2150	2060	2200	1980	2220	2010
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	1.32	1.14	1.25	1.24	1.24	1.19
Total Organic Carbon	mg/L		0.50	1.20	1.20	1.10	1.05	1.03	1.02
Total Metals									
Aluminum (Al)-Total	mg/L		0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Antimony (Sb)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	0.00066	0.00054	0.00055
Arsenic (As)-Total	mg/L	0.0125 ^b	0.00040	0.00122	0.00124	0.00133	0.00128	0.00130	0.00140
Barium (Ba)-Total	mg/L		0.0010	0.0124	0.0123	0.0121	0.0126	0.0125	0.0130
Beryllium (Be)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L		0.10	3.80	3.77	3.81	3.74	3.75	3.75
Cadmium (Cd)-Total	mg/L	long-term: 0.00012	0.000020	0.000050	0.000050	0.000050	0.000053	0.000052	0.000052
Calcium (Ca)-Total	mg/L		0.50	333	328	332	330	326	325
Cesium (Cs)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.0015; Cr(III): 0.056 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L		0.000050	0.000418	0.000364	0.000439	0.000385	0.000425	0.000376
Gallium (Ga)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L		0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead (Pb)-Total	mg/L		0.00005 or 0.0003	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.020	0.124	0.118	0.117	0.116	0.119	0.116
Magnesium (Mg)-Total	mg/L		1.0	1040	1010	1020	1010	986	956
Manganese (Mn)-Total	mg/L		0.000050	0.00183	0.00184	0.00182	0.00185	0.00232	0.00217
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.016 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L		0.0020	0.0081	0.0082	0.0079	0.0082	0.0078	0.0084
Nickel (Ni)-Total	mg/L		0.000050	0.000429	0.000459	0.000494	0.000448	0.000433	0.000457
Phosphorus (P)-Total	mg/L		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Potassium (K)-Total	mg/L		20	313	310	314	309	310	306
Rhenium (Re)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L		0.0050	0.149	0.140	0.130	0.137	0.134	0.140
Selenium (Se)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L		0.50	0.60	0.59	0.60	0.54	0.67	0.63
Silver (Ag)-Total	mg/L	short-term: 0.0075	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L		20	8960	8900	8960	8820	8860	8740
Strontium (Sr)-Total	mg/L		0.050	5.79	5.77	5.81	5.70	5.74	5.65
Tellurium (Te)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L		0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L		0.000050	0.00259	0.00256	0.00248	0.00247	0.00249	0.00250
Vanadium (V)-Total	mg/L		0.00050	0.00073	0.00073	0.00064	0.00073	0.00068	0.00064
Yttrium (Y)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L		0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080	<0.00080
Zirconium (Zr)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Radiological Parameters									
Ra-226	Bq/L		0.010	0.0100	<0.0100	<0.0100	<0.0100	0.012	<0.0100

Notes:

All sample parameters were below CCME guidelines for the protection of marine life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of marine aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

Annex A.3-3. Marine Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				RBW 1 1 20-Jul-2015 L1646027-3	RBW 2 1 20-Jul-2015 L1646027-4	RBE 1 surface 20-Jul-2015 L1646027-1	RBE 2 surface 20-Jul-2015 L1646027-2	REF-Marine 1 1 20-Jul-2015 L1646027-5	REF-Marine 1 2 20-Jul-2015 L1646027-6
	Units	CCME guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Hardness (as CaCO ₃)	mg/L		4.3	4070	3000	250	357	2350	2250
pH	pH	7.0 to 8.7	0.10	7.81	7.79	7.53	7.62	7.68	7.67
Salinity	psu	dependent on background levels ^b	1.0	24.3	22.3	1.3	2.7	13.4	13.5
Total Suspended Solids	mg/L	dependent on background levels	2.0	4.7	7.6	3.9	4.6	8.9	10.7
Total Dissolved Solids	mg/L		80	26900	22600	1740	2830	14200	14200
Turbidity	NTU	dependent on background levels	0.10	1.73	4.28	5.81	6.38	9.42	9.44
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		2.0	92.0	85.6	30.6	36.0	56.2	55.3
Ammonia, Total (as N)	mg/L		0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		5.0	48.8	45.0	2.6	5.1	25.5	26.0
Chloride (Cl)	mg/L		50	14200	13000	752	1480	7460	7590
Fluoride (F)	mg/L		0.4 to 2.0	<2.0	<2.0	<0.40	<0.40	<2.0	<2.0
Nitrate and Nitrite (as N)	mg/L		0.0060	0.0112	0.0095	0.0247	0.0060	0.0154	0.0106
Nitrate (as N)	mg/L	short-term: 339; long-term: 45	0.0060	0.0112	0.0095	0.022	0.006	0.0154	0.0082
Nitrite (as N)	mg/L		0.0020	<0.0020	<0.0020	0.0027	<0.0020	<0.0020	0.0024
Total Kjeldahl Nitrogen	mg/L		0.050	0.136	0.139	0.370	0.389	0.179	0.178
Orthophosphate-Dissolved (as P)	mg/L		0.0010	0.0291	0.0253	0.0011	<0.0010	0.0129	0.0139
Phosphorus (P)-Total	mg/L		0.010	0.041	0.037	0.027	0.020	0.029	0.030
Sulfate (SO ₄)	mg/L		50	1980	1820	95	198	1030	1050
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	1.68	1.87	5.99	5.60	2.63	2.50
Total Organic Carbon	mg/L		0.50	1.37	1.72	6.10	5.15	2.52	2.73
Total Metals									
Aluminum (Al)-Total	mg/L		0.0050	0.0461	0.224	0.148	0.168	0.238	0.204
Antimony (Sb)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.0125 ^b	0.00040	0.00044	0.00080	<0.00040	<0.00040	0.00081	0.00062
Barium (Ba)-Total	mg/L		0.0010	0.0094	0.0090	0.0044	0.0043	0.0076	0.0083
Beryllium (Be)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L		0.10	3.43	2.63	0.19	0.29	1.87	1.82
Cadmium (Cd)-Total	mg/L	long-term: 0.00012	0.000020	0.000037	0.000035	<0.000010	<0.000010	0.000023	0.000024
Calcium (Ca)-Total	mg/L		0.50	267	197	20.7	27.4	152	148
Cesium (Cs)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.0015; Cr(III): 0.056 ^b	0.00050	<0.00050	0.00071	<0.00050	<0.00050	0.00076	0.00071
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	0.000161	0.000077	0.000087	0.000137	0.000132
Copper (Cu)-Total	mg/L		0.000050	0.000427	0.000894	0.00738	0.00207	0.000826	0.000794
Gallium (Ga)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L		0.010	0.051	0.243	0.165	0.162	0.239	0.205
Lead (Pb)-Total	mg/L		0.00005 or 0.0003	<0.000050	0.000086	0.000101	<0.000050	0.000146	0.000100
Lithium (Li)-Total	mg/L		0.020	0.123	0.090	<0.020	<0.020	0.067	0.065
Magnesium (Mg)-Total	mg/L		1.0	826	610	48.1	70.0	480	457
Manganese (Mn)-Total	mg/L		0.000050	0.00256	0.00702	0.0140	0.0148	0.00531	0.00512
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.016 ^b	0.00050	<0.00050	<0.00050	0.00069	0.00069	0.00054	0.00053
Molybdenum (Mo)-Total	mg/L		0.0020	0.0070	0.0056	<0.0020	<0.0020	0.0038	0.0040
Nickel (Ni)-Total	mg/L		0.000050	0.000396	0.000621	0.000426	0.000434	0.000576	0.000547
Phosphorus (P)-Total	mg/L		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Potassium (K)-Total	mg/L		20	254	186	<20	22	143	140
Rhenium (Re)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L		0.0050	0.109	0.0785	0.0062	0.0097	0.0641	0.0613
Selenium (Se)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L		0.50	<0.50	0.69	1.07	1.15	0.74	0.66
Silver (Ag)-Total	mg/L	short-term: 0.0075	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L		20	7280	5070	415	604	4130	3800
Strontium (Sr)-Total	mg/L		0.050	5.03	3.69	0.315	0.450	2.96	2.77
Tellurium (Te)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L		0.0050	<0.0050	0.0177	0.0073	0.0082	0.0182	0.0158
Tungsten (W)-Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L		0.000050	0.00194	0.00152	0.000138	0.000180	0.00108	0.00106
Vanadium (V)-Total	mg/L		0.00050	0.00077	0.00119	<0.00050	<0.00050	0.00103	0.00097
Yttrium (Y)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L		0.00080	<0.00080	0.00101	0.00139	<0.00080	0.00095	0.00089
Zirconium (Zr)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100	0.014	<0.0100

Notes:

All sample parameters were below CCME guidelines for the protection of marine life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of marine aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

Annex A.3-3. Marine Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				RBW 1 1 6-Aug-2015 L1654820-2	RBW 2 1 6-Aug-2015 L1654820-3	RBE 1 1 6-Aug-2015 L1654820-5	RBE 2 1 6-Aug-2015 L1654820-6	REF-Marine 1 1 8-Aug-2015 L1656584-1	REF-Marine 1 2 8-Aug-2015 L1656584-2
	Units	CCME guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Hardness (as CaCO ₃)	mg/L		4.3	3700	3580	1150	1230	2710	2650
pH	pH	7.0 to 8.7	0.10	7.76	7.83	7.66	7.74	7.79	7.79
Salinity	psu	dependent on background levels ^b	1.0	22.2	22.4	5.2	9.1	16.0	16.0
Total Suspended Solids	mg/L	dependent on background levels	2.0	<2.0	<2.0	5.1	3.9	<2.0	<2.0
Total Dissolved Solids	mg/L		80	24000	24500	5550	9780	17000	16300
Turbidity	NTU	dependent on background levels	0.10	0.78	0.68	3.29	2.66	0.91	0.81
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		2.0	102	103	38.3	45.2	49.2	79.9
Ammonia, Total (as N)	mg/L		0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L		5.0	44.1	42.5	9.6	17.3	30.2	30.7
Chloride (Cl)	mg/L		50	12900	12500	2850	5100	8810	8920
Fluoride (F)	mg/L		0.4 to 2.0	<2.0	<2.0	<1.0	<2.0	<2.0	<2.0
Nitrate and Nitrite (as N)	mg/L		0.0060	0.0406	<0.0060	<0.0060	<0.0060	<0.0060	0.0314
Nitrate (as N)	mg/L	short-term: 339; long-term: 45	0.0060	0.0406	<0.0060	<0.0060	<0.0060	<0.0060	0.0314
Nitrite (as N)	mg/L		0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Total Kjeldahl Nitrogen	mg/L		0.050	0.136	0.127	0.342	0.318	0.160	0.176
Orthophosphate-Dissolved (as P)	mg/L		0.0010	0.0228	0.0234	<0.0010	<0.0010	0.0153	0.0158
Phosphorus (P)-Total	mg/L		0.010	0.030	0.026	0.018	0.019	0.021	0.017
Sulfate (SO ₄)	mg/L		50	1800	1740	392	704	1250	1260
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	1.44	1.59	4.99	5.47	2.49	2.57
Total Organic Carbon	mg/L		0.50	1.75	1.76	5.45	6.01	2.05	2.15
Total Metals									
Aluminum (Al)-Total	mg/L		0.0050	0.0349	0.0274	0.0923	0.0850	0.0242	0.0241
Antimony (Sb)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.0125 ^b	0.00040	0.00090	0.00108	0.00053	0.00050	0.00074	0.00078
Barium (Ba)-Total	mg/L		0.0010	0.0090	0.0091	0.0050	0.0053	0.0073	0.0071
Beryllium (Be)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L		0.10	3.05	3.07	1.34	1.35	2.17	2.24
Cadmium (Cd)-Total	mg/L	long-term: 0.00012	0.000020	0.000034	0.000035	0.000014	0.000013	0.000025	0.000026
Calcium (Ca)-Total	mg/L		0.50	238	227	78.0	82.8	183	181
Cesium (Cs)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.0015; Cr(III): 0.056 ^b	0.00050	0.00090	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	<0.000050	<0.000050	0.000063	0.000057	<0.000050	<0.000050
Copper (Cu)-Total	mg/L		0.000050	0.00134	0.000631	0.00109	0.00100	0.00109	0.000561
Gallium (Ga)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L		0.010	0.028	0.028	0.126	0.118	0.039	0.043
Lead (Pb)-Total	mg/L		0.00005 or 0.0003	0.000052	0.000060	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L		0.020	0.104	0.103	0.032	0.035	0.072	0.074
Magnesium (Mg)-Total	mg/L		1.0	754	731	232	248	546	533
Manganese (Mn)-Total	mg/L		0.000050	0.00245	0.00246	0.0117	0.0110	0.00250	0.00253
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.016 ^b	0.00050	<0.00050	<0.00050	0.00070	0.00073	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L		0.0020	0.0068	0.0069	0.0021	0.0022	0.0049	0.0049
Nickel (Ni)-Total	mg/L		0.000050	0.000796	0.000407	0.000470	0.000458	0.000380	0.000393
Phosphorus (P)-Total	mg/L		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Potassium (K)-Total	mg/L		20	228	216	73	78	173	170
Rhenium (Re)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L		0.0050	0.0833	0.0822	0.0223	0.0228	0.0556	0.0552
Selenium (Se)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L		0.50	<0.50	<0.50	0.82	0.84	<0.50	<0.50
Silver (Ag)-Total	mg/L	short-term: 0.0075	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L		20	6300	5980	1940	2090	4780	4710
Strontium (Sr)-Total	mg/L		0.050	4.20	4.06	1.32	1.42	3.13	3.08
Tellurium (Te)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L		0.0050	<0.0050	<0.0050	0.0057	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L		0.000050	0.00200	0.00196	0.000628	0.000670	0.00147	0.00145
Vanadium (V)-Total	mg/L		0.00050	0.00068	0.00067	<0.00050	<0.00050	<0.00050	0.00052
Yttrium (Y)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L		0.00080	<0.00080	<0.00080	0.00170	0.00172	<0.00080	<0.00080
Zirconium (Zr)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100

Notes:

All sample parameters were below CCME guidelines for the protection of marine life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of marine aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

Annex A.3-3. Marine Water Quality Data, Doris North Project, 2015

Site ID: Replicate: Depth Sampled (m): Date Sampled: ALS Sample ID:				RBW 1 1 15-Sep-2015 L1675361-3	RBW 2 1 15-Sep-2015 L1675361-4	RBE 1 1 16-Sep-2015 L1675361-1	RBE 2 1 16-Sep-2015 L1675361-2	REF-Marine 1 1 16-Sep-2015 L1675361-5	REF-Marine 1 2 16-Sep-2015 L1675361-6
	Units	CCME guideline for the Protection of Aquatic life ^a	Realized Detection Limit						
Physical Tests									
Hardness (as CaCO ₃)	mg/L		4.3	4100	4220	4650	4710	4370	4380
pH	pH	7.0 to 8.7	0.10	7.86	7.83	7.81	7.84	7.86	7.84
Salinity	psu	dependent on background levels ^b	1.0	24.5	24.3	26.1	26.3	25.5	25.3
Total Suspended Solids	mg/L	dependent on background levels	2.0	12.3	12.1	<2.0	<2.0	<2.0	2.1
Total Dissolved Solids	mg/L		80	26800	26300	28600	28100	27700	27600
Turbidity	NTU	dependent on background levels	0.10	4.99	6.67	0.50	0.28	0.52	0.55
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L		2.0	111	111	114	116	115	114
Ammonia, Total (as N)	mg/L		0.0050	<0.0050	<0.0050	0.0072	0.0053	<0.0050	<0.0050
Bromide (Br)	mg/L		5.0	48.7	47.4	52.3	53.0	50.8	50.0
Chloride (Cl)	mg/L		50	14000	13600	15000	15200	14500	14400
Fluoride (F)	mg/L		0.4 to 2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Nitrate and Nitrite (as N)	mg/L		0.0060	<0.0060	<0.0060	0.0168	0.0125	<0.0060	<0.0060
Nitrate (as N)	mg/L	short-term: 339; long-term: 45	0.0060	<0.0060	<0.0060	0.0168	0.0125	<0.0060	<0.0060
Nitrite (as N)	mg/L		0.0020	<0.0020	0.0023	<0.0020	<0.0020	<0.0020	<0.0020
Total Kjeldahl Nitrogen	mg/L		0.050	0.130	0.144	0.095	0.093	0.117	0.106
Orthophosphate-Dissolved (as P)	mg/L		0.0010	0.0242	0.0214	0.0324	0.0330	0.0286	0.0283
Phosphorus (P)-Total	mg/L		0.010	0.040	0.038	0.037	0.033	0.034	0.035
Sulfate (SO ₄)	mg/L		50	1980	1940	2130	2160	2070	2040
Cyanides									
Cyanide, Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L		0.50	1.48	1.61	1.40	1.23	1.38	1.31
Total Organic Carbon	mg/L		0.50	1.74	1.59	1.30	1.20	1.61	1.94
Total Metals									
Aluminum (Al)-Total	mg/L		0.0050	0.299	0.342	0.0303	0.0370	0.0355	0.0360
Antimony (Sb)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Arsenic (As)-Total	mg/L	0.0125 ^b	0.00040	0.00102	0.00120	0.00110	0.00109	0.00103	0.00116
Barium (Ba)-Total	mg/L		0.0010	0.0133	0.0147	0.0128	0.0124	0.0115	0.0113
Beryllium (Be)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Bismuth (Bi)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L		0.10	2.90	3.08	3.26	3.33	3.26	3.20
Cadmium (Cd)-Total	mg/L	long-term: 0.00012	0.000020	0.000041	0.000041	0.000046	0.000045	0.000041	0.000044
Calcium (Ca)-Total	mg/L		0.50	283	288	312	320	296	297
Cesium (Cs)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Chromium (Cr)-Total	mg/L	Cr(VI): 0.0015; Cr(III): 0.056 ^b	0.00050	0.00092	0.00084	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L		0.000050	0.000173	0.000168	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L		0.000050	0.00172	0.00185	0.00168	0.00102	0.000520	0.000736
Gallium (Ga)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Iron (Fe)-Total	mg/L		0.010	0.280	0.231	0.021	0.017	0.034	0.035
Lead (Pb)-Total	mg/L		0.00005 or 0.0003	<0.00030	<0.00030	<0.000050	<0.000050	<0.000050	<0.00030
Lithium (Li)-Total	mg/L		0.020	0.114	0.113	0.123	0.123	0.116	0.117
Magnesium (Mg)-Total	mg/L		1.0	823	851	940	950	883	884
Manganese (Mn)-Total	mg/L		0.000050	0.00628	0.00616	0.00222	0.00210	0.00229	0.00258
Mercury (Hg)-Total	ug/L	Inorganic Hg: 0.016 ^b	0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L		0.0020	0.0075	0.0080	0.0088	0.0090	0.0084	0.0084
Nickel (Ni)-Total	mg/L		0.000050	0.00110	0.000757	0.000477	0.000479	0.000432	0.000441
Phosphorus (P)-Total	mg/L		1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Potassium (K)-Total	mg/L		20	256	265	289	293	273	275
Rhenium (Re)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Rubidium (Rb)-Total	mg/L		0.0050	0.100	0.107	0.117	0.120	0.107	0.112
Selenium (Se)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Silicon (Si)-Total	mg/L		0.50	1.07	1.11	<0.50	<0.50	<0.50	<0.50
Silver (Ag)-Total	mg/L	short-term: 0.0075	0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L		20	7290	7450	8190	8290	7640	7780
Strontium (Sr)-Total	mg/L		0.050	5.05	5.17	5.67	5.74	5.32	5.39
Tellurium (Te)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Thallium (Tl)-Total	mg/L		0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Thorium (Th)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Tin (Sn)-Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L		0.0050	0.0232	0.0229	<0.0050	<0.0050	<0.0050	<0.0050
Tungsten (W)-Total	mg/L		0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Uranium (U)-Total	mg/L		0.000050	0.00205	0.00220	0.00227	0.00242	0.00225	0.00219
Vanadium (V)-Total	mg/L		0.00050	0.00137	0.00139	0.00069	0.00064	0.00069	0.00070
Yttrium (Y)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L		0.00080	0.00125	0.00136	0.00081	<0.00080	<0.00080	<0.00080
Zirconium (Zr)-Total	mg/L		0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Radiological Parameters									
Ra-226	Bq/L		0.010	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100

Notes:

All sample parameters were below CCME guidelines for the protection of marine life.

April sampling depths are depths below the water surface and are equal to approximately 0.25-1 m below ice.

^a Canadian water quality guidelines for the protection of marine aquatic life, Canadian Council of Ministers of the Environment, Accessed 2015.

^b Interim guideline.

Annex A.3-4. QA/QC Blank Data for Water Quality Sampling, Doris North Project, 2015

		Field Blank (Marine)	Travel Blank (Marine)	Equipment Blank (Marine)	Travel Blank (Freshwater)	Field Blank (Freshwater)	Equipment Blank (Freshwater)	Field Blank (Freshwater)	Travel Blank (Freshwater)
Blank Type: Date Sampled: ALS Sample ID:	Units	23-Apr-15 L1604607-7	23-Apr-15 L1604607-8	23-Apr-15 L1604607-9	25-Apr-2015 L1604660-11	25-Apr-2015 L1604660-12	25-Apr-2015 L1604660-13	14-Jun-2015 L1628043-11	13-Jun-2015 L1628043-12
Physical Tests									
Conductivity	uS/cm	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as CaCO ₃)	mg/L	<4.3	<4.3	<4.3	<0.50	<0.50	<0.50	<0.50	<0.50
pH	pH	5.73	5.41	5.86	5.51	5.49	5.48	5.53	5.62
Salinity	psu	<1.0	<1.0	<1.0	-	-	-	-	-
Total Suspended Solids	mg/L	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity	NTU	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ammonia, Total (as N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate and Nitrite (as N)	mg/L	<0.0060	<0.0060	0.0971	-	-	-	-	-
Nitrate (as N)	mg/L	<0.0060	<0.0060	0.0971	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	<0.0020	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO ₄)	mg/L	<0.50	<0.50	<0.50	<0.30	<0.30	<0.30	<0.30	<0.30
Cyanides									
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Organic Carbon	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals									
Aluminum (Al)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	<0.00040	<0.00040	<0.00040	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Barium (Ba)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Beryllium (Be)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	<0.10	<0.10	<0.10	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	<0.000020	<0.000020	<0.000020	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	<0.50	<0.50	<0.50	<0.050	<0.050	<0.050	<0.050	<0.050
Cesium (Cs)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	<0.000050	<0.000050	0.000822	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Gallium (Ga)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	<0.010	<0.010	<0.010	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	<0.020	<0.020	<0.020	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Magnesium (Mg)-Total	mg/L	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<0.10
Manganese (Mn)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mercury (Hg)-Total	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L	<0.0020	<0.0020	<0.0020	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Phosphorus (P)-Total	mg/L	<1.0	<1.0	<1.0	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L	<20	<20	<20	<2.0	<2.0	<2.0	<2.0	<2.0
Rhenium (Re)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Selenium (Se)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L	<0.50	<0.50	<0.50	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)-Total	mg/L	<0.00010	<0.00010	<0.00010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	<20	<20	<20	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	mg/L	<0.050	<0.050	<0.050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tellurium (Te)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tungsten (W)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Vanadium (V)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Zinc (Zn)-Total	mg/L	<0.00080	<0.00080	0.00220	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L	-	-	<0.0100	-	-	<0.0100	-	-

Note:
Bold values represent concentrations that are higher than analytical detection limits.

Annex A.3-4. QA/QC Blank Data for Water Quality Sampling, Doris North Project, 2015

		Equipment Blank (Freshwater)	Field Blank (Freshwater)	Travel Blank (Freshwater)	Equipment Blank (Marine)	Field Blank (Marine)	Travel Blank (Marine)	Equipment Blank (Freshwater)	Travel Blank (Freshwater)
Blank Type:		15-Jul-2015	18-Jul-2015	18-Jul-2015	19-Jul-2015	18-Jul-2015	18-Jul-2015	5-Aug-2015	5-Aug-2015
Date Sampled:									
ALS Sample ID:	Units	L1644328-1	L1645954-3	L1645954-6	L1645954-15	L1645954-16	L1645954-17	L1654748-1	L1654748-4
Physical Tests									
Conductivity	uS/cm	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as CaCO ₃)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
pH	pH	5.40	5.43	5.38	5.29	5.42	5.39	5.42	5.31
Salinity	psu	-	-	-	-	-	-	-	-
Total Suspended Solids	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity	NTU	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ammonia, Total (as N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate and Nitrite (as N)	mg/L	-	-	-	-	-	-	-	-
Nitrate (as N)	mg/L	0.0171	<0.0050	<0.0050	0.0164	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO ₄)	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Cyanides									
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Organic Carbon	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.52
Total Metals									
Aluminum (Al)-Total	mg/L	<0.0030	<0.0030	<0.0030	0.0046	<0.0030	<0.0030	0.0054	<0.0030
Antimony (Sb)-Total	mg/L	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Barium (Ba)-Total	mg/L	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Beryllium (Be)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Cesium (Cs)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.00064	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Gallium (Ga)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Magnesium (Mg)-Total	mg/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Manganese (Mn)-Total	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mercury (Hg)-Total	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Phosphorus (P)-Total	mg/L	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Rhenium (Re)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Selenium (Se)-Total	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tellurium (Te)-Total	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)-Total	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tungsten (W)-Total	mg/L	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Vanadium (V)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)-Total	mg/L	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Zinc (Zn)-Total	mg/L	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L	<0.0100	-	-	<0.0100	-	-	<0.0100	-

Note:
Bold values represent concentrations that are higher than analytical detection limits.

Annex A.3-4. QA/QC Blank Data for Water Quality Sampling, Doris North Project, 2015

		Equipment Blank (Marine)	Field Blank (Marine)	Travel Blank (Marine)	Field Blank (Freshwater)	Travel Blank (Freshwater)	Field Blank (Freshwater)	Equipment Blank (Freshwater)	Field Blank (Freshwater)
Blank Type: Date Sampled: ALS Sample ID:	Units	5-Aug-2015 L1654820-1	6-Aug-2015 L1654820-4	8-Aug-2015 L1656584-3	10-Aug-2015 L1656611-5	13-Aug-2015 L1658082-5	16-Aug-2015 L1658889-9	17-Sep-2015 L1675358-7	16-Sep-2015 L1675358-10
Physical Tests									
Conductivity	uS/cm	-	-	-	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness (as CaCO ₃)	mg/L	<4.3	<4.3	<4.3	<0.50	<0.50	<0.50	<0.50	<0.50
pH	pH	5.36	5.73	6.36	5.40	5.40	5.43	5.27	5.47
Salinity	psu	<1.0	<1.0	<1.0	-	-	-	-	-
Total Suspended Solids	mg/L	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Dissolved Solids	mg/L	<10	<10	<10	<10	<10	<10	<10	<10
Turbidity	NTU	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anions and Nutrients									
Alkalinity, Total (as CaCO ₃)	mg/L	<2.0	<2.0	<2.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ammonia, Total (as N)	mg/L	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate and Nitrite (as N)	mg/L	<0.0060	<0.0060	<0.0060	-	-	-	-	-
Nitrate (as N)	mg/L	<0.0060	<0.0060	<0.0060	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	<0.0020	<0.0020	<0.0020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO ₄)	mg/L	<0.50	<0.50	<0.50	<0.30	<0.30	<0.30	<0.30	<0.30
Cyanides									
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon									
Dissolved Organic Carbon	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Organic Carbon	mg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Total Metals									
Aluminum (Al)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.0030	<0.0030	<0.0030	0.0147	<0.0030
Antimony (Sb)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000030	<0.000030	<0.000030	<0.000030	<0.000030
Arsenic (As)-Total	mg/L	<0.00040	<0.00040	<0.00040	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Barium (Ba)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010	<0.00010	0.00023	<0.00010
Beryllium (Be)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Bismuth (Bi)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	<0.10	<0.10	<0.10	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	<0.000010	<0.000010	<0.000010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	<0.50	<0.50	<0.50	<0.050	<0.050	<0.050	<0.050	<0.050
Cesium (Cs)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Chromium (Cr)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	0.000289	<0.000050	<0.000050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Gallium (Ga)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Iron (Fe)-Total	mg/L	<0.010	<0.010	<0.010	<0.030	<0.030	<0.030	<0.030	<0.030
Lead (Pb)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	<0.020	<0.020	<0.020	<0.00040	<0.00040	<0.00040	<0.00040	<0.00040
Magnesium (Mg)-Total	mg/L	<1.0	<1.0	<1.0	<0.10	<0.10	<0.10	<0.10	<0.10
Manganese (Mn)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Mercury (Hg)-Total	ug/L	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L	<0.0020	<0.0020	<0.0020	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Phosphorus (P)-Total	mg/L	<1.0	<1.0	<1.0	<0.30	<0.30	<0.30	<0.30	<0.30
Potassium (K)-Total	mg/L	<20	<20	<20	<2.0	<2.0	<2.0	<2.0	<2.0
Rhenium (Re)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Rubidium (Rb)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Selenium (Se)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Silicon (Si)-Total	mg/L	<0.50	<0.50	<0.50	<0.050	<0.050	<0.050	<0.050	<0.050
Silver (Ag)-Total	mg/L	<0.00010	<0.00010	<0.00010	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Sodium (Na)-Total	mg/L	<20	<20	<20	<2.0	<2.0	<2.0	<2.0	<2.0
Strontium (Sr)-Total	mg/L	<0.050	<0.050	<0.050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tellurium (Te)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thallium (Tl)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Thorium (Th)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Tin (Sn)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Titanium (Ti)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Tungsten (W)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Uranium (U)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.0000020	<0.0000020	<0.0000020	<0.0000020	<0.0000020
Vanadium (V)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Yttrium (Y)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Zinc (Zn)-Total	mg/L	0.00096	<0.00080	<0.00080	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Radiological Parameters									
Ra-226	Bq/L	<0.0100	-	-	-	-	-	<0.0100	-

Note:
Bold values represent concentrations that are higher than analytical detection limits.

Annex A.3-4. QA/QC Blank Data for Water Quality Sampling, Doris North Project, 2015

Blank Type: Date Sampled: ALS Sample ID:		Travel Blank (Marine) 16-Sep-2015 L1675361-7	Field Blank (Marine) 16-Sep-2015 L1675361-8	Equipment Blank (Marine) 15-Sep-2015 L1675361-9	Field Blank (Freshwater) 20-Sep-2015 L1676833-13
	Units				
Physical Tests					
Conductivity	uS/cm	-	-	-	<2.0
Hardness (as CaCO ₃)	mg/L	<4.3	<4.3	<4.3	<0.50
pH	pH	5.76	5.58	5.50	5.39
Salinity	psu	<1.0	<1.0	<1.0	-
Total Suspended Solids	mg/L	<2.0	<2.0	<2.0	<1.0
Total Dissolved Solids	mg/L	<10	<10	<10	<10
Turbidity	NTU	<0.10	<0.10	<0.10	<0.10
Anions and Nutrients					
Alkalinity, Total (as CaCO ₃)	mg/L	<2.0	<2.0	<2.0	<1.0
Ammonia, Total (as N)	mg/L	0.0412	<0.0050	<0.0050	<0.0050
Bromide (Br)	mg/L	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	mg/L	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	<0.020	<0.020	<0.020	<0.020
Nitrate and Nitrite (as N)	mg/L	<0.0060	<0.0060	<0.0060	-
Nitrate (as N)	mg/L	<0.0060	<0.0060	<0.0060	<0.0050
Nitrite (as N)	mg/L	<0.0020	<0.0020	<0.0020	<0.0010
Total Kjeldahl Nitrogen	mg/L	<0.050	<0.050	<0.050	<0.050
Orthophosphate-Dissolved (as P)	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Phosphorus (P)-Total	mg/L	<0.0020	<0.0020	<0.0020	<0.0020
Sulfate (SO ₄)	mg/L	<0.50	<0.50	<0.50	<0.30
Cyanides					
Cyanide, Total	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Cyanide, Free	mg/L	<0.0010	<0.0010	<0.0010	<0.0010
Organic / Inorganic Carbon					
Dissolved Organic Carbon	mg/L	<0.50	<0.50	<0.50	<0.50
Total Organic Carbon	mg/L	<0.50	<0.50	<0.50	<0.50
Total Metals					
Aluminum (Al)-Total	mg/L	<0.0050	<0.0050	0.0107	<0.0030
Antimony (Sb)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000030
Arsenic (As)-Total	mg/L	<0.00040	<0.00040	<0.00040	<0.000050
Barium (Ba)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.00010
Beryllium (Be)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050
Bismuth (Bi)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050
Boron (B)-Total	mg/L	<0.10	<0.10	<0.10	<0.010
Cadmium (Cd)-Total	mg/L	<0.000010	<0.000010	<0.000010	<0.0000050
Calcium (Ca)-Total	mg/L	<0.50	<0.50	<0.50	<0.050
Cesium (Cs)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050
Chromium (Cr)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050
Copper (Cu)-Total	mg/L	<0.000050	<0.000050	0.000077	<0.00050
Gallium (Ga)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050
Iron (Fe)-Total	mg/L	<0.010	<0.010	<0.010	<0.030
Lead (Pb)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	<0.020	<0.020	<0.020	<0.00040
Magnesium (Mg)-Total	mg/L	<1.0	<1.0	<1.0	<0.10
Manganese (Mn)-Total	mg/L	<0.000050	<0.000050	0.000117	<0.00020
Mercury (Hg)-Total	ug/L	<0.00050	<0.00050	<0.00050	<0.00050
Molybdenum (Mo)-Total	mg/L	<0.0020	<0.0020	<0.0020	<0.000050
Nickel (Ni)-Total	mg/L	<0.000050	<0.000050	0.000054	<0.00020
Phosphorus (P)-Total	mg/L	<1.0	<1.0	<1.0	<0.30
Potassium (K)-Total	mg/L	<20	<20	<20	<2.0
Rhenium (Re)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050
Rubidium (Rb)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.000020
Selenium (Se)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.00020
Silicon (Si)-Total	mg/L	<0.50	<0.50	<0.50	<0.050
Silver (Ag)-Total	mg/L	<0.00010	<0.00010	<0.00010	<0.0000050
Sodium (Na)-Total	mg/L	<20	<20	<20	<2.0
Strontium (Sr)-Total	mg/L	<0.050	<0.050	<0.050	<0.00020
Tellurium (Te)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000010
Thallium (Tl)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.0000050
Thorium (Th)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050
Tin (Sn)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.00020
Titanium (Ti)-Total	mg/L	<0.0050	<0.0050	<0.0050	<0.00020
Tungsten (W)-Total	mg/L	<0.0010	<0.0010	<0.0010	<0.000010
Uranium (U)-Total	mg/L	<0.000050	<0.000050	<0.000050	<0.0000020
Vanadium (V)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050
Yttrium (Y)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.0000050
Zinc (Zn)-Total	mg/L	<0.00080	<0.00080	<0.00080	<0.0030
Zirconium (Zr)-Total	mg/L	<0.00050	<0.00050	<0.00050	<0.000050
Radiological Parameters					
Ra-226	Bq/L	-	-	<0.0100	-

Note:
Bold values represent concentrations that are higher than analytical detection limits.

A.4 2015 SEDIMENT QUALITY

The following sections present the sediment quality data collected in August 2015 from stream, lake, and marine sites. Only the variables that were subjected to an evaluation of effects (see main body of report) are shown graphically. All sediment quality variables were screened against CCME sediment quality guidelines for the protection of aquatic life (CCME 2015a). CCME guidelines for sediments include interim sediment quality guidelines (ISQGs) and probable effects levels (PELs). The more conservative ISQGs are levels below which adverse biological effects are rarely observed. The higher PELs correspond to concentrations above which negative effects would be expected (CCME 2015a). CCME guidelines are included in all graphs and annexes.

A.4.1 Stream Data

Figures A.4-1 to A.4-5 show select sediment quality variable concentrations in the AEMP streams. Annex A.4-1 presents the full stream sediment quality dataset.

A.4.2 Lake Data

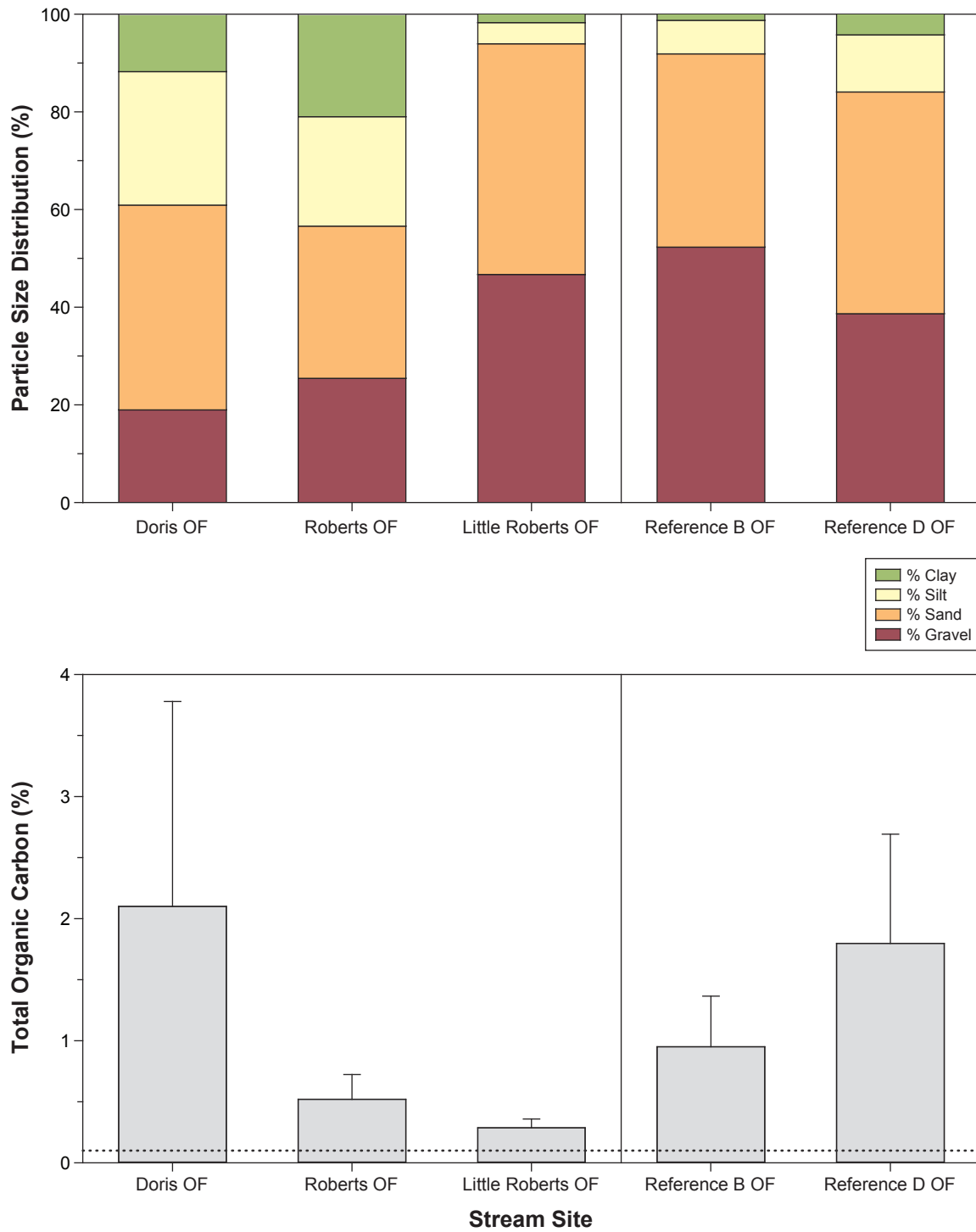
Figures A.4-6 to A.4-10 show select sediment quality variable concentrations in the AEMP lakes. Annex A.4-2 presents the full lake sediment quality dataset.

A.4.3 Marine Data

Figures A.4-11 to A.4-15 show select sediment quality variable concentrations at the AEMP marine sites. Annex A.4-3 presents the full marine sediment quality dataset.

Figure A.4-1

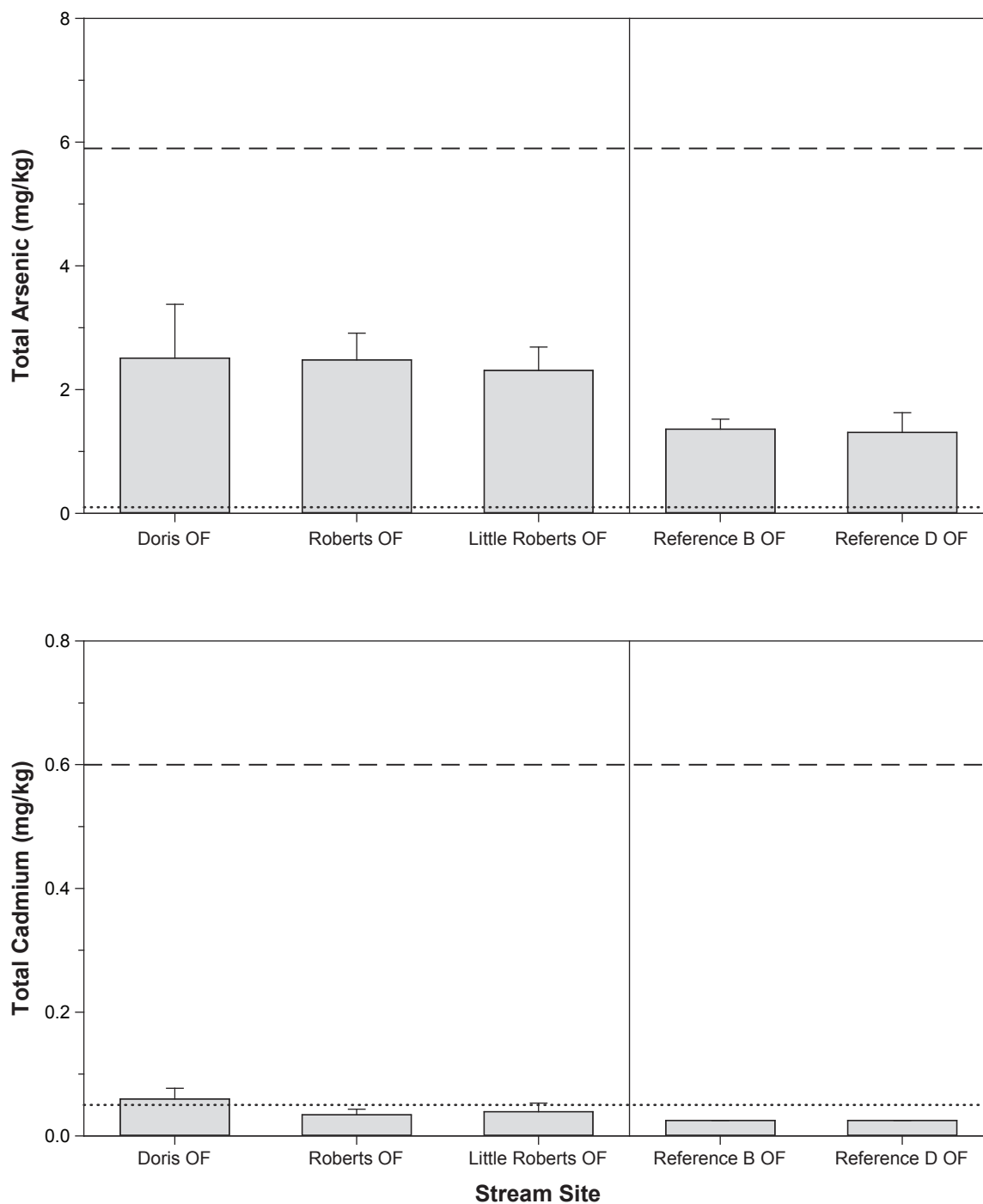
Particle Size Distribution and Total Organic Carbon Concentration
in Stream Sediments, Doris North Project, August 2015



Notes: Error bars represent the standard error of the mean of replicates.
Stacked bars represent the mean of replicate samples.
Dotted line represents the analytical detection limit; values below the detection limit are plotted at half the detection limit.
Particle size distribution and total organic carbon content of sediments are required parameters as part of benthic invertebrate surveys as per Schedule 5, s.16a (iii) of the MMER.

Figure A.4-2

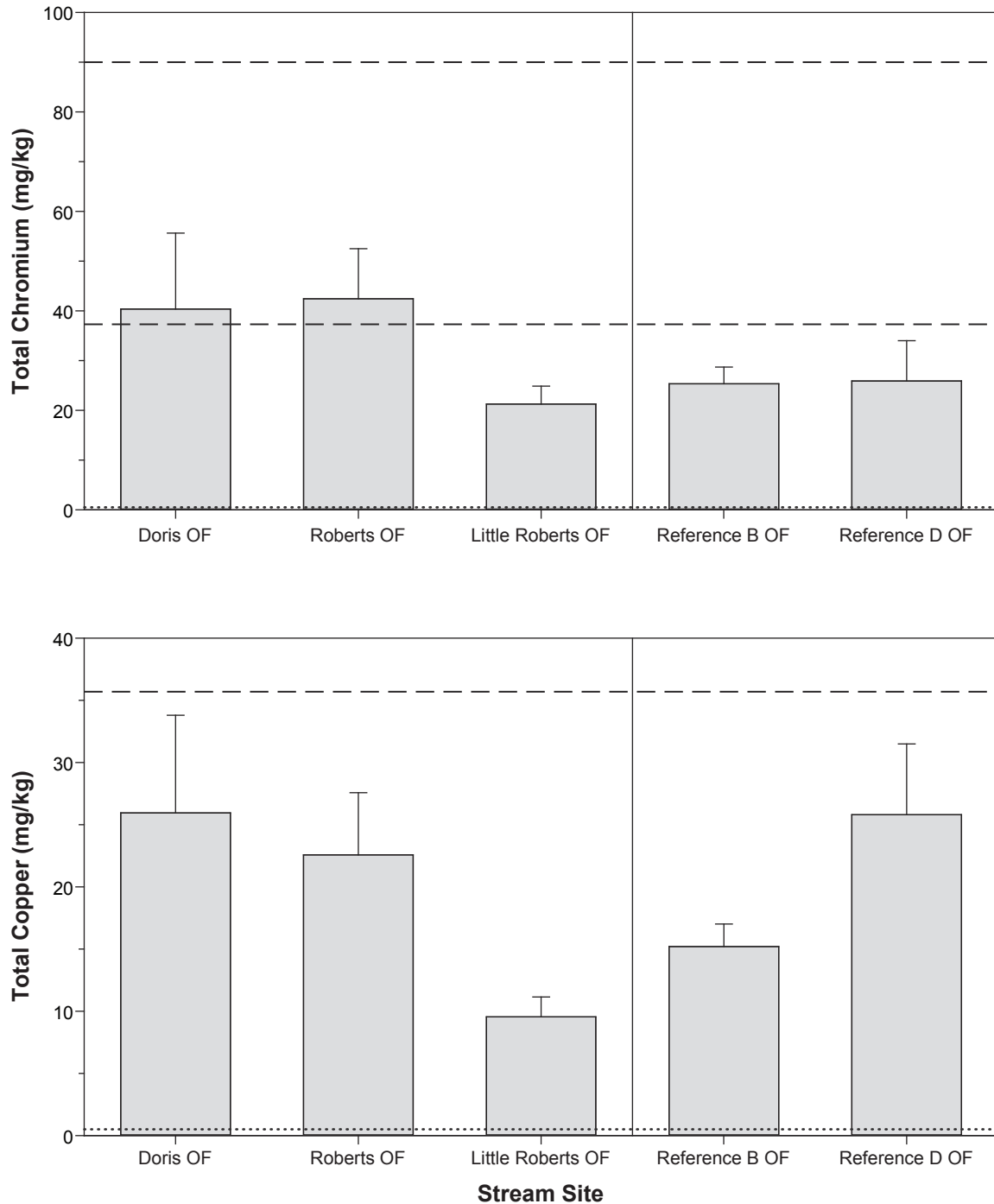
Total Arsenic and Total Cadmium Concentrations in Stream Sediments, Doris North Project, August 2015



Notes: Error bars represent the standard error of the mean of replicates.
Dotted lines represent analytical detection limits; values below the detection limit are plotted at half the detection limit.
Dashed lines represent the CCME freshwater interim sediment quality guidelines (ISQGs) for arsenic (5.9 mg/kg) and cadmium (0.6 mg/kg); probable effects levels (PELs) for arsenic (17 mg/kg) and cadmium (3.5 mg/kg) are not shown.

Figure A.4-3

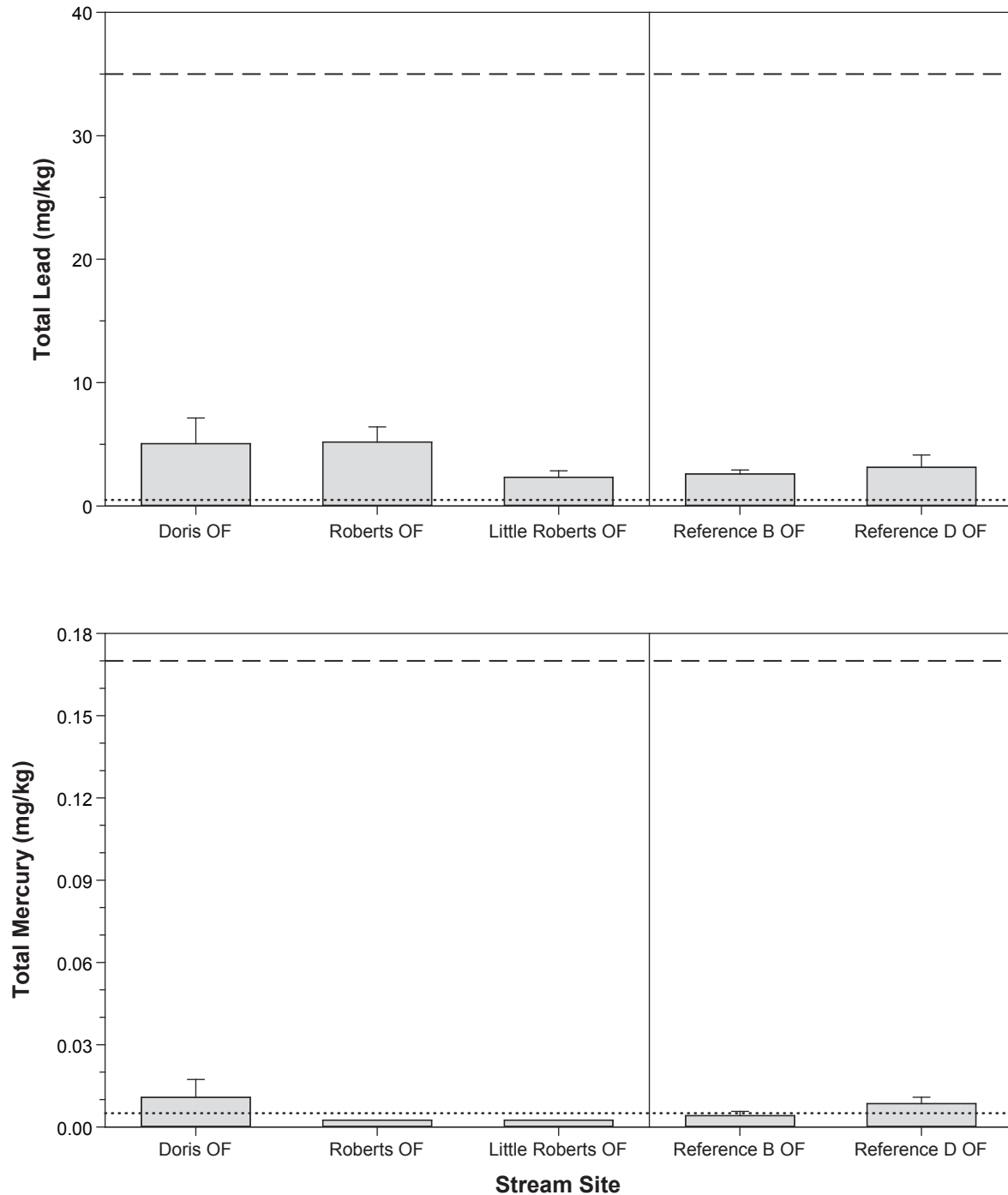
**Total Chromium and Total Copper Concentrations
in Stream Sediments, Doris North Project, August 2015**



Notes: Error bars represent the standard error of the mean of replicates.
Dotted lines represent analytical detection limits; values below the detection limit are plotted at half the detection limit.
Dashed lines represent the CCME freshwater interim sediment quality guidelines (ISQGs) for chromium (37.3 mg/kg) and copper (35.7 mg/kg) and the probable effects level (PEL) for chromium (90 mg/kg); the PEL for copper (197 mg/kg) is not shown.

Figure A.4-4

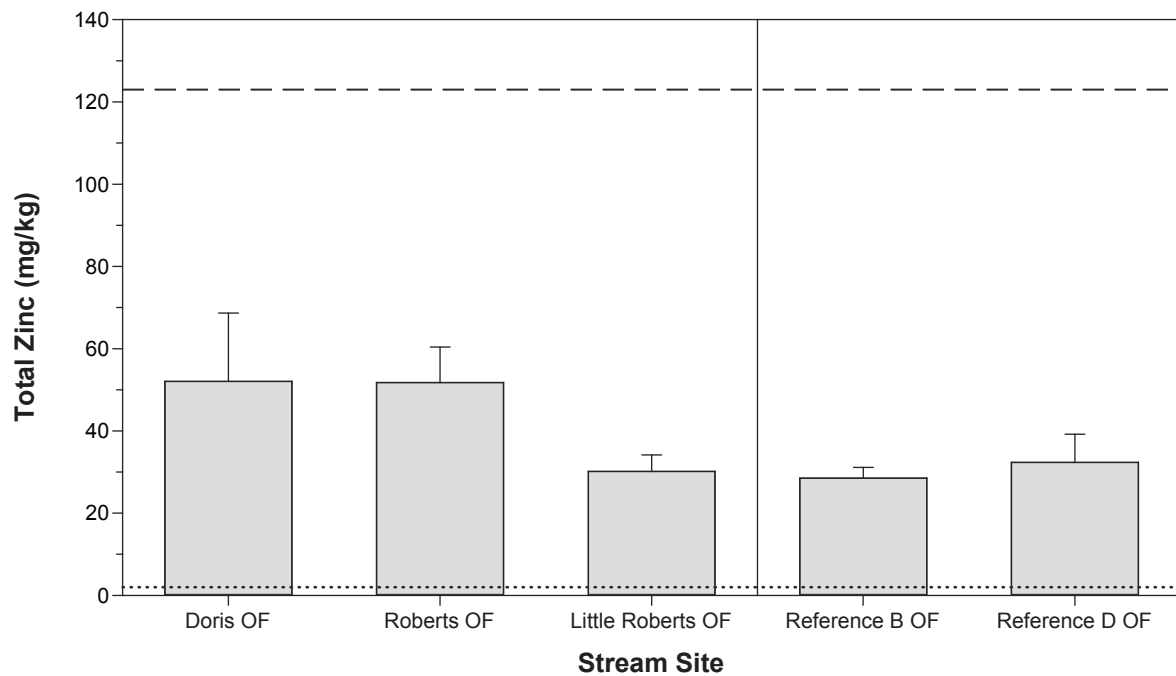
Total Lead and Total Mercury Concentrations
in Stream Sediments, Doris North Project, August 2015



Notes: Error bars represent the standard error of the mean of replicates.
Dotted lines represent analytical detection limits; values below the detection limit are plotted at half the detection limit.
Dashed lines represent the CCME freshwater interim sediment quality guidelines (ISQGs) for lead (35 mg/kg) and mercury (0.17 mg/kg); probable effects levels (PELs) for lead (91.3 mg/kg) and mercury (0.486 mg/kg) are not shown.

Figure A.4-5

Total Zinc Concentrations in Stream Sediments,
Doris North Project, August 2015



Notes: Error bars represent the standard error of the mean of replicates.
Dotted lines represent analytical detection limits; values below the detection limit are plotted at half the detection limit.
Dashed line represents the CCME freshwater interim sediment quality guideline (ISQG) for zinc (123 mg/kg);
the probable effects level (PEL) for zinc (315 mg/kg) is not shown.