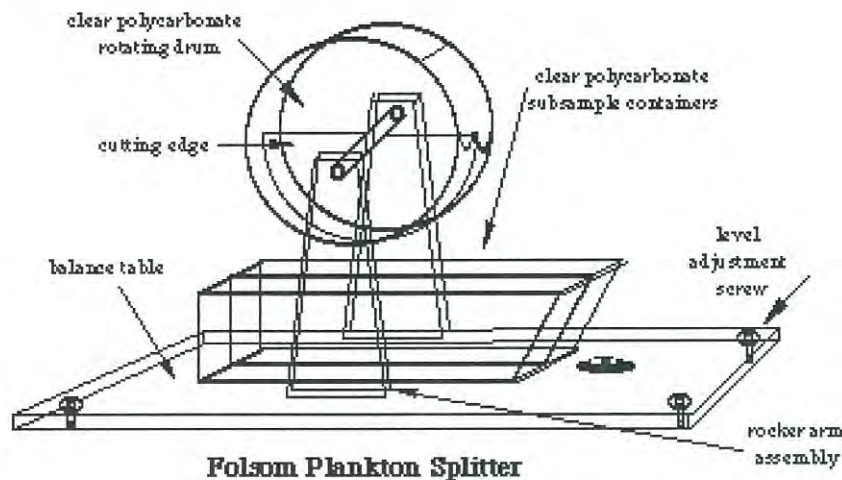


APPENDIX 1. BENTHIC INVERTEBRATE SUB-SAMPLING PROTOCOL

SUBSAMPLING PROTOCOL NORTH/SOUTH CONSULTANTS

Using a Folsom splitter

This splitting method uses a larger version of the Folsom plankton splitter, and is based on the random distribution of the sample within the drum.



The sample is placed in the drum with up to 4 litres of water to allow the sample to distribute freely. The drum is then rotated in an 180° arc several times to ensure even and random distribution of the sample. The drum is then rotated to divide the sample in half, and each fraction is then emptied into a separate subsample container.

The number of times a sample is split is dependant on the number of organisms estimated to be in the original sample, based on an assessment before the sample is split. Thus, the subsample will be an exponential fraction of the original (i.e., $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, etc).

To obtain the estimated total number of organisms in the sample, simply multiply the number of organisms found in the subsample by the bottom number of the fraction. For example, if 200 organisms were found in $\frac{1}{4}$ of the sample, $200 \times 4 = 800$ organisms in the original sample.

Quality Assurance / Quality Control - Precision and Accuracy

(Our formulae for determining the precision and accuracy of the Folsom splitter are based on the 2002 EEM Guiding Document.)

Accuracy

This is how accurate each fraction is in estimating the actual number of organisms in a sample. It is determined by sorting the organisms out of each individual fraction and obtaining the estimated number of organisms in the original sample as stated above. After this has been done

for each fraction, each estimated number is compared to the actual number of organisms in the sample (by adding the number of organisms found in each fraction).

$$\% \text{ Accuracy} = [(\text{Estimated \# bugs} - \text{Actual \# bugs}) / \text{Actual \# bugs}] \times 100$$

% Accuracy must fall within 20%.

Precision

This is how precise each subsample is compared to every other subsample (i.e., are they the same?). It is determined by comparing the number of organisms found in each fraction to the number found in every other fraction.

$$\text{Precision} = [1 - (\# \text{ bugs in subsample A} / \# \text{ bugs in subsample B})] \times 100$$

% Precision must fall within 20%.

As of this date, we have subjected 12 samples to the Quality Assurance / Quality Control methods stated above. These were large drift trap samples from which fish, fish eggs, invertebrates, and plants were extracted for analysis. Our precision after 12 samples was within 18% of having exactly the same number of organisms in each fraction. Our accuracy was within 8% of the actual number in the sample.

APPENDIX 2.
BENTHIC INVERTEBRATE TAXONOMIC IDENTIFICATION
QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

**BENTHIC INVERTEBRATE TAXONOMIC IDENTIFICATION
QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES
NORTH/SOUTH CONSULTANTS INC.**

Sample Processing

Sorting aquatic samples involves removing aquatic macro-invertebrates and plant material from the organic and inorganic material within each sample.

Sorting Samples

- all sorting is conducted with a 3x desktop magnifier with lamp;
- all sorted samples are checked by a second laboratory technician;
- any additional invertebrates/plant materials collected during the QA/QC process are combined with the original sample, but counted separately;
- sorting efficiency must be $\geq 95\%$ or the sample must be re-sorted.

Verification of Taxonomic Identification

North/South Consultants Inc. taxonomists communicate with external taxonomic specialists to ensure accuracy and consistency.

Sample Identification

- samples are identified to the appropriate taxonomic level by an in-house or external taxonomist. Ten percent of these samples are randomly selected and sent to an external taxonomy specialist for QA/QC. The accuracy of the sample subset is assessed for identification and enumeration;
- all uncertain and unknown invertebrates/plants are sent to an external specialist;
- incorrect identifications and/or enumeration discrepancies are noted on the laboratory datasheet;
- the target overall accuracy level is 90% for invertebrate/plant identification and enumeration. The external taxonomists' corrected identification and enumeration values are used where discrepancies exist;
- all samples that fall outside the target accuracy level will be re-identified and/or re-enumerated.

Data Processing

Data processing involves entering data from laboratory data sheets into an MS Excel data template. Data templates include project name, study area, site locations, site labels, sampling date, sampling gear, taxa, life stages, and enumeration list. After raw data are entered into the template spreadsheet, a second technician verifies all entered data and formulae. A final verification is conducted by the report author.

APPENDIX 3. WATER AND SEDIMENT QUALITY GUIDELINES

A3-1. WATER QUALITY OBJECTIVES AND GUIDELINES FOR THE PROTECTION OF AQUATIC LIFE

The following is a summary of applicable water quality objectives and guidelines for evaluation of water chemistry data collected in the Lalor Lake Study Area. Unless otherwise indicated, the water quality guidelines discussed below refer to the Manitoba Water Quality Standards, Objectives, and Guidelines (MWQSOGs) presented in Williamson (2002).

A3-1.1. Ammonia

MWQSOGs for ammonia are dependent upon water temperature and pH and the presence of cool- or cold-water aquatic life (Williamson 2002). A representative range of Manitoba water quality objectives for ammonia appropriate for the range of pH and temperature measured in the Study Area (i.e., site-specific objectives) during water quality sampling is presented in Table A3-1.

Table A3-1. Range of applicable Manitoba Water Quality Objectives for ammonia, for the protection of cool-water and cold-water aquatic life and wildlife. Values calculated from algorithms provided in Williamson (2002) and the range of pH and water temperature measured in the Study Area during time of water sample collection. The most stringent objectives are indicated in red.

	pH	Temperature (°C)	Ammonia Objective (mg/L)		
			Averaging Period		
			30-day	4-day	1-hour
Cool-water species: early life stages present					
	7.42	6.5	4.66	11.65	22.34
		13.5	4.66	11.65	22.34
	8.26	6.5	1.63	4.07	5.10
		13.5	1.63	4.07	5.10
Cold-water species: early life stages absent					
	7.42	6.5	7.57	14.92	14.92
		13.5	4.98	12.45	14.92
	8.26	6.5	2.64	3.40	3.40
		13.5	1.74	3.40	3.40

A3-1.2. Dissolved Oxygen

Proposed objectives for dissolved oxygen are dependent upon water temperature, the presence of early life stages, and the presence of cool- or cold-water species (e.g., cool-water fish such as pike and walleye or cold-water fish species such as lake whitefish, Williamson 2002). Objectives are generally more stringent in environments inhabited by cold-water fish species. Objectives, which are specific for early life stages and mature life stages and vary according to the averaging duration, are presented in Table A3-2.

Table A3-2. Manitoba Water Quality Objectives for dissolved oxygen (Williamson 2002).

Conditions	Dissolved Oxygen Objective (mg/L)			
	Averaging Duration			
	Instantaneous Minimum	7 Day Minimum	7 Days	30 Days
Cold-Water Aquatic Life and Wildlife				
When Water Temperature $\leq 5^{\circ}\text{C}$ and Early Life Stages Present	8.0	-	9.5	-
When Water Temperature $> 5^{\circ}\text{C}$ and Mature Life Stages Present	4.0	5.0	-	6.5
Cool-Water Aquatic Life and Wildlife				
When Water Temperature $\leq 5^{\circ}\text{C}$ and Mature Life Stages Present	3.0	4.0	-	5.5
When Water Temperature $> 5^{\circ}\text{C}$ and Early Life Stages Present	5.0	-	6.0	-

In the open-water season, when water temperature is greater than 5°C and early life stages of cold-water fish species are not present, objectives are less stringent (objectives range from 4.0 to 6.5 mg/L). However, early life stages of spring spawning fish species (e.g., brook stickleback) may be present in the Study Area at this time, thus requiring application of appropriate guidelines to ensure their protection (i.e., early life stages are present for cool water species). Of the two, objectives for the protection of mature life stages of cold-water fish species and early life stages of cool-water fish species (i.e., when water temperature is greater than 5°C) are similar, with one major exception. The instantaneous minimum for the protection of early life stages of cool-water fish species in the ice-free season (5.0 mg/L) is more stringent than the instantaneous minimum objective for the protection of mature life stages of cold-water fish species (4.0 mg/L); chronic objectives are similar for both (5.0 to 6.5 mg/L).

A3-1.3. Total Suspended Solids (TSS) and Turbidity

MWQSOGs for TSS and turbidity vary according to the environment; the applicable objective for the study area is an allowable increase in TSS of 5 mg/L (applies to aquatic environments where 'background' TSS is ≤ 25 mg/L) for the protection of aquatic life (Williamson 2002).

A3-1.4. Nitrate

The CCME (1999; updated to 2007) guideline for nitrate is 2.93 mg N/L for the protection of aquatic life; there is currently no guideline for Manitoba.

A3-1.5. Total Phosphorus

There is a narrative guideline for total phosphorus in Manitoba to prevent nuisance growth and reproduction of aquatic rooted, attached and floating plants, fungi, or bacteria or to otherwise render the water unsuitable for other beneficial uses. The guideline is 0.05 mg/L for streams and 0.025 mg/L for reservoirs, lakes, ponds, or tributaries at the point of entry to these bodies of water.

A3-1.6. pH

The Manitoba guideline for pH for the protection of aquatic life is a range of 6.5-9.0.

A3-1.7. Metals and Major Ions

Table A3-3. MWQSOGs (chronic) for select elements and major ions (Williamson 2002). The most stringent objectives/guidelines are indicated in red.

Element	Freshwater Aquatic Life		Drinking Water		
	Guidelines: Not dependent on water hardness	Objectives for Total Metals: Dependent on water hardness	Maximum Acceptable Concentration	Interim Maximum Acceptable Concentration	Aesthetic Objective
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Ag	0.0001	-	-	-	-
Al	0.100 ²	-	-	-	-
As	0.150 ³	-	-	0.025	-
B	-	-	-	5.0	-
Ba	-	-	1.0	-	-
Cd	-	0.00134 – 0.00267 ⁴	0.005	-	-
Chlorid	-	-	-	-	≤ 250
Cr (III)	-	0.046 – 0.094 ⁴	0.050 ⁵	-	-
Cu	-	0.005 – 0.010 ⁴	-	-	≤ 1.0
Fe	0.300	-	-	-	≤ 0.300
Hg	0.0001	-	0.001	-	-
Mn	-	-	-	-	≤ 0.050

Table A3-3. - continued -

Element	Freshwater Aquatic Life		Drinking Water		
	Guidelines: Not dependent on water hardness	Objectives for Total Metals: Dependent on water hardness	Maximum Acceptable Concentration	Interim Maximum Acceptable Concentration	Aesthetic Objective
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
Mo	0.073	-	-	-	-
Na	-	-	-	-	≤ 200
Ni	-	0.027 – 0.057 ⁴	-	-	-
Pb	-	0.0012 – 0.0036 ⁴	0.010	-	-
Sb	-	-	-	0.006	-
Se	0.001	-	0.010	-	-
Sulphat	-	-	-	-	≤ 500
Tl	0.0008	-	-	-	-
U	-	-	-	0.020	-
Zn	-	0.06 – 0.13 ⁴	-	-	≤ 5

¹ Based on range of water hardness measured in the Study Area.

² Guideline based on pH (>6.5), calcium concentrations (>4.0 mg/L), and TOC concentrations (>2 mg/L) in the Study Area.

³ Dissolved arsenic objective (Williamson 2002).

⁴ Values represent the chronic (4-day averaging duration objective) objectives.

⁵ Total chromium (i.e., Cr (III) + Cr (VI)).

APPENDIX 4.
QUALITY ASSURANCE/QUALITY CONTROL RESULTS FOR
WATER AND SEDIMENT QUALITY ANALYSES

Table A4-1. Quality assurance/quality control results for routine water chemistry variables measured in the laboratory. Percent relative standard deviations (PRSD) were calculated for triplicate samples and values above 18% are indicated in red. Field and trip blank measurements more than five times the analytical detection limits are also indicated in red.

Sample Location	Location ID	Lab ID	Sample Date	Alkalinity			Nitrogen			Phosphorus			Carbon		
				as Bicarbonate (HCO ₃ ⁻) (mg/L)	Total as CaCO ₃ (mg/L)	as Carbonate (CO ₃ ²⁻) (mg/L)	as Hydroxide (OH ⁻) (mg/L)	Dissolved Ammonia (mg/L N)	Dissolved Nitrate/nitrite (mg/L N)	Dissolved Nitrite (mg/L N)	TKN (mg/L)	Dissolved (mg/L)		Total (mg/L)	TOC (mg/L)
Analytical Detection Limit															
				2	1	0.6	0.4	0.003	0.005	0.01	0.2	0.001	0.001	1	1
Triplicate Samples															
Lalor Lake	LL.2	LL-2-S	09/08/07	95	78	<0.6	<0.4	0.048	0.055	<0.01	1.1	0.005	0.008	20	18
		LL-4-S	09/08/07	94	77	<0.6	<0.4	0.030	0.021	<0.01	1.1	0.008	0.012	21	18
		LL-5-S	09/08/07	94	77	<0.6	<0.4	0.041	0.060	<0.01	1.2	0.004	0.008	20	18
		Mean		94	77	<0.6	<0.4	0.040	0.045	<0.01	1.1	0.006	0.009	20	18
		SD		1	1	-	-	0.009	0.021	-	0.1	0.002	0.002	1	0
		PRSD		1	1	-	-	23	-	-	5	-	25	3	0
Cook Lake	CL.3	CL-3-B	09/12/07	79	65	<0.6	<0.4	0.004	0.020	<0.01	0.7	0.008	0.019	15	13
		CL-4-B	09/12/07	64	78	<0.6	<0.4	0.006	0.019	<0.01	0.7	0.008	0.023	16	13
		CL-5-B	09/12/07	76	62	<0.6	<0.4	0.009	0.017	<0.01	0.7	0.007	0.020	15	13
		Mean		73	68	<0.6	<0.4	0.006	0.019	<0.01	0.7	0.008	0.021	15	13
		SD		8	9	-	-	0.003	0.002	-	0.0	0.001	0.002	1	0
		PRSD		11	12	-	-	-	-	-	-	8	10	4	0
Blank Samples															
Trip Blank			15/9/2007	2	2	<0.6	<0.4	0.013	0.009	<0.01	<0.2	<0.001	<0.001	<1	<1
Field Blank	GL-1		15/9/2007	2	2	<0.6	<0.4	0.003	0.020	<0.01	<0.2	<0.001	0.001	<1	<1

Table A4-1. - Continued -

Sample Location	Location ID	Lab ID	Sample Date	TDS (mg/L)	Conductivity (µmhos/cm)	Hardness (as CaCO ₃) (mg/L)	Water Clarity			Algal Pigments			
							TSS (mg/L)	Turbidity (NTU)	True Colour (TCU)	Lab pH	Acidity (as CaCO ₃) (mg/L)	Chlorophyll <i>a</i> (µg/L)	Pheophytin (µg/L)
Analytical Detection Limit													
				5	0.4	0.3	2	0.05	5	0.01	1	1	1.00
<u>Triplicate Samples</u>													
Lalor Lake	LL 2	LL-2-S	09/08/07	110	148	74.9	<2	1.0	15	8.24	<1	<1	1.38
		LL-4-S	09/08/07	130	147	74.5	2	1.1	15	8.25	<1	1	1.33
		LL-5-S	09/08/07	130	148	73.7	<2	1.0	15	8.26	1	2	1.22
		Mean		123	148	74.4	<2	1.0	15	8.25	<1	1	1.31
		SD		12	1	0.6	-	0.1	0	0.01	-	1	0.08
		PRSD		9	0	1	-	6	-	0	-	-	6
Cook Lake	CL 3	CL-3-B	09/12/07	76	137	57.0	3	2.6	35	7.94	1	9	1.56
		CL-4-B	09/12/07	76	137	61.8	5	2.6	35	7.42	2	9	1.59
		CL-5-B	09/12/07	78	139	61.6	3	2.5	35	7.64	1	9	1.61
		Mean		77	138	60.1	4	2.6	35	7.67	1	9	1.59
		SD		1	1	2.7	1	0.1	0	0.26	0.6	0	0.03
		PRSD		2	1	5	-	2	0	3	-	0	2
<u>Blank Samples</u>													
Trip Blank			15/9/2007	<5	1.7	<0.3	<2	0.05	<5	5.62	<1	<1	1.00
Field Blank	GL-1		15/9/2007	18	1.1	0.4	<2	0.05	<5	5.61	<1	<1	1.00

Table A4-2. Comparison of dissolved oxygen (DO) concentrations measured *in situ* and in the laboratory. Relative percent mean difference (RPMD) was derived as indicated in Section 2.9.2.1.

Sample Location	Location ID	Lab ID	Sample Date	Dissolved Oxygen (mg/L)		RPMD (%)
				Laboratory	<i>In Situ</i>	
Lalor Lake	LL 2	LL-2-S	09/08/07	9.5	9.82	3
Maw Lake	ML 2	ML-2-S	09/09/07	9.5	10.21	7
Varnson Lake	VL 2	VL-2-S	09/10/07	9.4	9.82	4
Tern Lake	TL 2B	TL-1-S	09/11/07	9.4	10.53	11

Table A4-3. Quality assurance/quality control results for metals and major ions measured in the laboratory: fall 2007. Percent relative standard deviations (PRSD) were calculated for triplicate samples and values above 18% are indicated in blue. Field and trip blank measurements more than five times the analytical detection limits are indicated in red.

Sample Location	Location ID	Lab ID	Sample Date	Hardness as CaCO ₃ (mg/L)	Aluminum		Antimony		Arsenic		Barium		Beryllium	
					Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)
Analytical Detection Limit														
				0.3	0.002	0.005	0.001	0.001	0.0005	0.0005	0.0003	0.0003	0.001	0.001
<u>Triplicate Samples</u>														
Lalor Lake	LL 2	LL-2-S	09/08/07	74.9	<0.002	0.008	<0.001	<0.001	0.0005	0.0007	0.0116	0.0118	<0.001	<0.001
		LL-4-S	09/08/07	74.5	<0.002	0.007	<0.001	<0.001	0.0005	0.0006	0.0120	0.0109	<0.001	<0.001
		LL-5-S	09/08/07	73.7	<0.002	0.007	<0.001	<0.001	0.0005	0.0006	0.0116	0.0109	<0.001	<0.001
		Mean		74.4	<0.002	0.007	<0.001	<0.001	0.0005	0.0006	0.0117	0.0112	<0.001	<0.001
		SD		0.6	-	0.001	-	-	0.0000	0.0001	0.0002	0.0005	-	-
		PRSD		1	-	-	-	-	-	-	2	5	-	-
Cook Lake	CL 3	CL-3-B	09/12/07	57.0	0.003	0.055	<0.001	<0.001	<0.0005	0.0005	0.0162	0.0149	<0.001	<0.001
		CL-4-B	09/12/07	61.8	0.003	0.061	<0.001	<0.001	<0.0005	<0.0005	0.0156	0.0154	<0.001	<0.001
		CL-5-B	09/12/07	61.6	0.003	0.061	<0.001	<0.001	<0.0005	<0.0005	0.0150	0.0152	<0.001	<0.001
		Mean		60.1	0.003	0.059	<0.001	<0.001	<0.0005	<0.0005	0.0156	0.0152	<0.001	<0.001
		SD		2.7	0.000	0.003	-	-	-	-	0.0006	0.0003	-	-
		PRSD		5	-	6	-	-	-	-	4	2	-	-
<u>Blanks</u>														
Trip Blank	Trip Blank	Trip Blank	15/9/2007	<0.3	<0.002	<0.005	<0.001	<0.001	<0.0005	<0.0005	<0.0003	<0.0003	<0.001	<0.001
Field Blank	GL-1	GL-1	15/9/2007	0.4	<0.002	<0.005	<0.001	<0.001	<0.0005	<0.0005	<0.0003	<0.0003	<0.001	<0.001

Table A4-3. - Continued -

Sample Location	Location ID	Lab ID	Sample Date	Bismuth		Boron		Cadmium		Calcium		Cesium	
				Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)
Analytical Detection Limit													
				0.0003	0.0002	0.009	0.03	0.00002	0.05	0.1	0.0001	0.0001	0.0001
Triplicate Samples													
Lalor Lake	LL 2	LL-2-S	09/08/07	<0.0003	<0.0002	<0.02	<0.03	<0.00002	18.9	18.5	<0.0001	<0.0001	<0.0001
		LL-4-S	09/08/07	<0.0003	<0.0002	<0.02	<0.03	<0.00002	19.5	18.4	<0.0001	<0.0001	<0.0001
		LL-5-S	09/08/07	<0.0003	<0.0002	<0.02	<0.03	<0.00002	19.3	18.1	<0.0001	<0.0001	<0.0001
		Mean		<0.0003	<0.0002	<0.02	<0.03	<0.00002	19.2	18.3	<0.0001	<0.0001	<0.0001
		SD		-	-	-	-	-	0.3	0.2	-	-	-
		PRSD		-	-	-	-	-	2	1	-	-	-
Cook Lake	CL 3	CL-3-B	09/12/07	<0.0003	<0.0002	<0.02	<0.03	<0.00002	16.2	13.9	<0.0001	<0.0001	<0.0001
		CL-4-B	09/12/07	<0.0003	<0.0002	<0.02	<0.03	<0.00002	15.1	14.1	<0.0001	<0.0001	<0.0001
		CL-5-B	09/12/07	<0.0003	<0.0002	<0.02	<0.03	<0.00002	15.1	14.3	<0.0001	<0.0001	<0.0001
		Mean		<0.0003	<0.0002	<0.02	<0.03	<0.00002	15.5	14.1	<0.0001	<0.0001	<0.0001
		SD		-	-	-	-	-	0.6	0.2	-	-	-
		PRSD		-	-	-	-	-	4	1	-	-	-
Blanks													
Trip Blank	Trip Blank	Trip Blank	15/9/2007	<0.0003	<0.0002	<0.02	<0.03	<0.00002	0.07	<0.1	<0.0001	<0.0001	<0.0001
Field Blank	GL-1	GL-1	15/9/2007	<0.0003	<0.0002	<0.02	<0.03	<0.00002	0.14	<0.1	<0.0001	<0.0001	<0.0001

Table A4-3. - Continued -

Sample Location	Location ID	Lab ID	Sample Date	Chromium		Cobalt		Copper		Iron		Lead	
				Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)
Analytical Detection Limit				0.001	0.001	0.0002	0.0002	0.0004	0.001	0.002	0.02	0.0001	0.0005
Triplicate Samples													
Lalor Lake	LL 2	LL-2-S	09/08/07	<0.001	<0.001	<0.0002	<0.0002	<0.0004	<0.001	0.032	0.10	<0.0001	<0.0005
		LL-4-S	09/08/07	<0.001	<0.001	<0.0002	<0.0002	0.0004	<0.001	0.037	0.12	0.0001	<0.0005
		LL-5-S	09/08/07	0.001	<0.001	<0.0002	<0.0002	<0.0004	<0.001	0.034	0.12	<0.0001	<0.0005
		Mean		<0.001	<0.001	<0.0002	<0.0002	<0.0004	<0.001	0.034	0.11	<0.0001	<0.0005
		SD		-	-	-	-	-	-	0.003	0.01	-	-
		PRSD		-	-	-	-	-	-	7	10	-	-
Cook Lake	CL 3	CL-3-B	09/12/07	<0.001	<0.001	<0.0002	<0.0002	0.0005	<0.001	0.003	0.10	<0.0001	<0.0005
		CL-4-B	09/12/07	<0.001	<0.001	<0.0002	<0.0002	0.0005	<0.001	<0.002	0.10	<0.0001	<0.0005
		CL-5-B	09/12/07	<0.001	<0.001	<0.0002	<0.0002	0.0006	<0.001	<0.002	0.10	<0.0001	<0.0005
		Mean		<0.001	<0.001	<0.0002	<0.0002	0.0005	<0.001	<0.002	0.10	<0.0001	<0.0005
		SD		-	-	-	-	0.0001	-	-	0.00	-	-
		PRSD		-	-	-	-	-	-	-	0	-	-
Blanks													
Trip Blank	Trip Blank	Trip Blank	15/9/2007	<0.001	<0.001	<0.0002	<0.0002	<0.0004	<0.001	<0.002	<0.02	<0.0001	<0.0005
Field Blank	GL-1	GL-1	15/9/2007	<0.001	<0.001	<0.0002	<0.0002	<0.0004	<0.001	<0.002	<0.02	<0.0001	<0.0005

Table A4-3. - Continued -

Sample Location	Location ID	Lab ID	Sample Date	Manganese		Magnesium		Mercury		Molybdenum		Nickel	
				Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)
Analytical Detection Limit				0.0002	0.0003	0.01	0.01	0.00005	0.00005	0.0001	0.0002	0.0002	0.002
Triplicate Samples													
Lalor Lake	LL 2	LL-2-S	09/08/07	0.0087	0.0216	6.93	6.95	<0.00005	<0.00005	<0.0001	<0.0002	0.0008	<0.002
		LL-4-S	09/08/07	0.0150	0.0231	7.06	6.90	<0.00005	<0.00005	<0.0001	<0.0002	0.0012	<0.002
		LL-5-S	09/08/07	0.0119	0.0221	7.09	6.89	<0.00005	<0.00005	<0.0001	<0.0002	0.0022	<0.002
		Mean		0.0119	0.0223	7.03	6.91	<0.00005	<0.00005	<0.0001	<0.0002	0.0014	<0.002
		SD		0.0032	0.0008	0.09	0.03	-	-	-	-	0.0007	-
		PRSD		27	3	1	0	-	-	-	-	-	-
Cook Lake	CL 3	CL-3-B	09/12/07	0.0053	0.0292	6.12	5.44	<0.00005	<0.00005	<0.0001	<0.0002	0.0003	<0.002
		CL-4-B	09/12/07	0.0047	0.0288	5.87	5.59	<0.00005	<0.00005	<0.0001	<0.0002	0.0004	<0.002
		CL-5-B	09/12/07	0.0079	0.0292	5.83	5.63	<0.00005	<0.00005	<0.0001	<0.0002	0.0004	<0.002
		Mean		0.0060	0.0291	5.94	5.55	<0.00005	<0.00005	<0.0001	<0.0002	0.0004	<0.002
		SD		0.0017	0.0002	0.16	0.10	-	-	-	-	0.0001	-
		PRSD		29	1	3	2	-	-	-	-	-	-
Blanks													
Trip Blank	Trip Blank	Trip Blank	15/9/2007	0.0002	<0.0003	<0.01	<0.01	<0.00005	<0.00005	<0.0001	<0.0002	<0.002	<0.002
Field Blank	GL-1	GL-1	15/9/2007	<0.0002	<0.0003	0.02	<0.01	<0.00005	<0.00005	<0.0001	<0.0002	<0.002	<0.002

Table A4-3. - Continued -

Sample Location	Location ID	Lab ID	Sample Date	Potassium		Rubidium		Selenium		Silicon		Silver	
				Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)
Analytical Detection Limit													
				0.05	0.1	0.0002	0.0002	0.001	0.001	0.2	0.0001	0.0001	0.001
Triplicate Samples													
Lalor Lake	LL2	LL-2-S	09/08/07	1.71	2.0	0.0017	0.0016	<0.001	<0.001	<0.2	<0.0001	<0.0001	<0.0001
		LL-4-S	09/08/07	1.74	2.0	0.0017	0.0016	<0.001	<0.001	<0.2	<0.0001	<0.0001	<0.0001
		LL-5-S	09/08/07	1.75	1.9	0.0017	0.0015	<0.001	<0.001	<0.2	<0.0001	<0.0001	<0.0001
		Mean		1.73	2.0	0.0017	0.0016	<0.001	<0.001	<0.2	<0.0001	<0.0001	<0.0001
		SD		0.02	0.1	0.0000	0.0001	-	-	-	-	-	-
		PRSD		1	3	0	4	-	-	-	-	-	-
Cook Lake	CL3	CL-3-B	09/12/07	1.76	1.5	0.0013	0.0012	<0.001	<0.001	0.5	<0.0001	<0.0001	<0.0001
		CL-4-B	09/12/07	1.63	1.6	0.0013	0.0013	<0.001	<0.001	0.5	<0.0001	<0.0001	<0.0001
		CL-5-B	09/12/07	1.65	1.6	0.0013	0.0012	<0.001	<0.001	0.5	<0.0001	<0.0001	<0.0001
		Mean		1.68	1.6	0.0013	0.0012	<0.001	<0.001	0.5	<0.0001	<0.0001	<0.0001
		SD		0.07	0.1	0.0000	0.0001	-	-	0.0	-	-	-
		PRSD		4	4	0	5	-	-	0	-	-	-
Blanks													
Trip Blank	Trip Blank	Trip Blank	15/9/2007	<0.05	<0.1	<0.0002	<0.0002	<0.001	<0.001	<0.2	<0.0001	<0.0001	<0.0001
Field Blank	GL-1	GL-1	15/9/2007	0.05	<0.1	<0.0002	<0.0002	<0.001	<0.001	<0.2	<0.0001	<0.0001	<0.0001

Table A4-3. - Continued -

Sample Location	Location ID	Lab ID	Sample Date	Sodium		Strontium		Tellurium		Tin		Titanium	
				Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)
Analytical Detection Limit				0.02	0.03	0.0001	0.0001	0.0005	0.001	0.0003	0.0006	0.0005	0.0009
Triplicate Samples													
Lalor Lake	LL 2	LL-2-S	09/08/07	2.01	1.88	0.0285	0.0270	<0.0005	<0.001	<0.0003	<0.0006	<0.0005	<0.0009
		LL-4-S	09/08/07	2.08	1.86	0.0295	0.0276	<0.0005	<0.001	<0.0003	<0.0006	<0.0005	<0.0009
		LL-5-S	09/08/07	1.95	1.83	0.0286	0.0273	<0.0005	<0.001	<0.0003	<0.0006	<0.0005	<0.0009
		Mean		2.01	1.86	0.0289	0.0273	<0.0005	<0.001	<0.0003	<0.0006	<0.0005	<0.0009
		SD		0.1	0.0	0.0006	0.0003	-	-	-	-	-	-
		PRSD		3	1	2	1	-	-	-	-	-	-
Cook Lake	CL 3	CL-3-B	09/12/07	2.19	1.92	0.0297	0.0254	<0.0005	<0.001	<0.0003	0.0020	<0.0005	0.0018
		CL-4-B	09/12/07	2.06	1.94	0.0286	0.0264	<0.0005	<0.001	<0.0003	<0.0006	<0.0005	0.0025
		CL-5-B	09/12/07	2.04	1.95	0.0281	0.0269	<0.0005	<0.001	<0.0003	<0.0006	<0.0005	0.0024
		Mean		2.10	1.94	0.0288	0.0262	<0.0005	<0.001	<0.0003	0.0009	<0.0005	0.0022
		SD		0.1	0.0	0.0008	0.0008	-	-	-	0.0010	-	0.0004
		PRSD		4	1	3	3	-	-	-	-	-	-
Blanks													
Trip Blank	Trip Blank	Trip Blank	15/9/2007	<0.02	<0.03	<0.0001	<0.0001	<0.0005	<0.001	<0.0003	<0.0006	<0.0005	<0.0009
Field Blank	GL-1	GL-1	15/9/2007	0.04	<0.03	<0.0001	<0.0001	<0.0005	<0.001	<0.0003	<0.0006	<0.0005	<0.0009

Table A4-3.- Continued -

Sample Location	Location ID	Lab ID	Sample Date	Thallium		Tungsten		Uranium		Vanadium		Zinc		Zirconium	
				Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)	Dissolved (mg/L)	Total (mg/L)
Analytical Detection Limit				0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.001	0.001	0.002	0.01	0.0004	0.0004
Triplicate Samples															
Lalor Lake	LL 2	LL-2-S	09/08/07	<0.0001	<0.0001	<0.0002	0.0002	<0.0001	<0.0001	0.001	<0.0001	<0.0002	<0.01	<0.0004	<0.0004
		LL-4-S	09/08/07	<0.0001	<0.0001	<0.0002	<0.0002	<0.0001	<0.0001	0.001	<0.0001	<0.0002	<0.01	<0.0004	<0.0004
		LL-5-S	09/08/07	<0.0001	<0.0001	<0.0002	<0.0002	<0.0001	<0.0001	0.001	<0.0001	<0.0002	<0.01	<0.0004	<0.0004
		Mean		<0.0001	<0.0001	<0.0002	<0.0002	<0.0001	<0.0001	0.001	<0.0001	<0.0002	<0.01	<0.0004	<0.0004
		SD		-	-	-	-	-	-	0.000	-	-	-	-	-
		PRSD		-	-	-	-	-	-	0	-	-	-	-	-
Cook Lake															
	CL 3	CL-3-B	09/12/07	<0.0001	<0.0001	<0.0002	<0.0002	<0.0001	<0.0001	<0.001	<0.001	<0.002	<0.01	<0.0004	<0.0004
		CL-4-B	09/12/07	<0.0001	<0.0001	<0.0002	<0.0002	<0.0001	<0.0001	<0.001	<0.001	<0.002	<0.01	<0.0004	<0.0004
		CL-5-B	09/12/07	<0.0001	<0.0001	<0.0002	<0.0002	<0.0001	<0.0001	<0.001	<0.001	<0.002	<0.01	<0.0004	<0.0004
		Mean		<0.0001	<0.0001	<0.0002	<0.0002	<0.0001	<0.0001	<0.001	<0.001	<0.002	<0.01	<0.0004	<0.0004
		SD		-	-	-	-	-	-	-	-	-	-	-	-
		PRSD		-	-	-	-	-	-	-	-	-	-	-	-
Blanks															
Trip Blank	Trip Blank	Trip Blank	15/9/2007	<0.0001	<0.0001	<0.0002	<0.0002	<0.0001	<0.0001	<0.001	<0.001	<0.002	<0.01	<0.0004	<0.0004
Field Blank	GL-1	GL-1	15/9/2007	<0.0001	<0.0001	<0.0002	<0.0002	<0.0001	<0.0001	<0.001	<0.001	<0.002	0.01	<0.0004	<0.0004

Table A4-4. Quality assurance/quality control results for sediment quality variables measured in the laboratory: fall 2007. Percent relative standard deviations (PRSD) were calculated for triplicate samples and values above 18% are indicated in red.

Sample Location	Location ID	Lab ID	Sample Date	Total Metals and Minerals ($\mu\text{g/g d.w.}$)													
				Aluminum	Arsenic	Barium	Beryllium	Boron	Bismuth	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	
				3	0.03	0.04	0.06	0.6	0.02	0.02	7	0.1	0.01	0.2	6	0.05	
Lalor Lake	LL-2	LL-2	8/9/2007	6,150	11.9	83.0	0.37	14.6	0.09	0.39	8,590	38.8	7.46	46.3	13,300	4.73	
	LL-4	LL-4	8/9/2007	7,060	8.68	89.0	0.41	13.9	0.06	0.33	8,620	36.9	7.36	46.3	13,500	2.55	
	LL-5	LL-5	8/9/2007	5,350	4.91	69.4	0.31	15.2	0.07	0.33	8,030	26.3	6.05	39.7	13,700	3.87	
			Mean	6,187	8.50	80.5	0.36	14.6	0.07	0.35	8,413	34.0	6.96	44.1	13,500	3.72	
			SD	856	3	10	0.05	0.7	0.02	0.03	332	7	0.79	4	200	1.10	
		PRSD	14	41	12	14	4	-	10	4	20	11	9	1	30		

Table A4-4. - Continued -

Sample Location	Location ID	Lab ID	Sample Date	Total Metals and Minerals (µg/g d.w.)												
				Magnesium	Manganese	Mercury	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium
				2	0.09	1	0.02	0.2	7	0.1	1	2	0.02	0.2	4	0.03
Lalor Lake	LL-2	LL-2	8/9/2007	2,990	243	<1	2.08	27.1	984	1.8	<1	178	20.9	<0.2	<4	310
		LL-4	8/9/2007	3,100	244	<1	1.85	28.6	1,080	1.9	<1	189	21.9	<0.2	<4	362
		LL-5	8/9/2007	2,580	259	<1	1.65	23.0	839	1.6	<1	183	17.7	<0.2	<4	252
		Mean		2,890	249	<1	1.86	26.2	968	1.8	<1	183	20.2	<0.2	<4	308
		SD		274	9	-	0.22	3	121	0.2	-	6	2.2	-	-	55
		PRSD		9	4	-	12	11	13	9	-	3	11	-	-	18

Table A4-4. - Continued -

Sample Location	Location ID	Lab ID	Sample Date	Total Metals and Minerals (µg/g d.w.)			Nutrients		Carbon (%)			Particle Size Composition (%)			
				Uranium	Vanadium	Zinc	TN (%)	TP (µg/g)	Total Organic	Inorganic	Total	CaCO ₃ Equivalent	Sand	Silt	Clay
Analytical Detection Limit															
Lalor Lake	LL-2	LL-2	8/9/2007	0.02	0.06	2	0.01	90	0.1	0.1	0.1	0.7	1	1	1
				1.72	29.8	66	2.77	640	29.4	0.1	29.5	1.5	2	52	46
		LL-4	8/9/2007	1.82	28.8	65	2.93	620	31.8	<0.1	31.8	1.2	1	50	49
		LL-5	8/9/2007	1.88	25.0	59	2.84	530	32.1	0.1	32.3	1.7	2	59	39
		Mean		1.81	27.9	63	2.85	597	31.1	<0.1	31.2	1.5	2	54	45
		SD		0.08	2.5	4	0.08	59	1.5	-	1.5	0.3	1	5	5
		PRSD		4	9	6	3	10	5	-	5	-	-	9	11

APPENDIX 5. METAL CONCENTRATIONS IN FORAGE FISH

Table A5-1. Detailed results of analysis of metals in whole bodies of forage fish collected in Lalor Lake. Values in red exceeded the Manitoba aquatic life tissue residue guideline for human consumers.

Fish ID	Supporting Information			Metal Concentration (µg/g w.w.)																	
	Length (mm)	Weight (g)	Sex	Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	
Brook stickleback																					
LL-BKST-36	72	3.09	F	4.8	<0.1	<0.2	2.5	<0.1	<0.1	<0.1	<0.01	9800	<0.6	<0.06	0.9	32	<0.06	500	8.1	0.06	
LL-BKST-46	70.3	2.5	F	1.7	<0.1	<0.2	3.1	<0.1	<0.1	<0.1	0.02	8500	<0.6	<0.06	1.2	63	<0.06	390	20	0.05	
LL-BKST-49	69.5	2.5	F	0.7	<0.1	<0.2	4.1	<0.1	<0.1	<0.1	<0.01	15000	<0.6	<0.06	0.9	28	<0.06	520	13	0.08	
LL-BKST-67	61	1.64	F	9.8	<0.1	<0.2	2.2	<0.1	<0.1	<0.1	0.02	11000	<0.6	<0.06	1.9	78	<0.06	360	11	0.03	
LL-BKST-23	58.7	1.31	F	<0.6	<0.1	<0.2	1.8	<0.1	<0.1	<0.1	0.01	7900	<0.6	<0.06	1.3	25	<0.06	420	10	0.08	
LL-BKST-53	58	1.22	F	1.4	<0.1	<0.2	5.2	<0.1	<0.1	<0.1	0.01	16000	<0.6	<0.06	1.5	50	<0.06	460	21	0.04	
LL-BKST-64	57	1.3	F	5.4	<0.1	<0.2	3	<0.1	<0.1	<0.1	0.02	11000	<0.6	<0.06	2	63	<0.06	400	8.8	0.05	
LL-BKST-68	56	1.15	F	<0.6	<0.1	<0.2	4.9	<0.1	<0.1	<0.1	<0.01	17000	<0.6	<0.06	1.3	29	<0.06	550	9.4	0.05	
LL-BKST-55	51.3	0.95	F	<0.3	<0.3	<0.5	8	<0.3	<0.3	<0.3	<0.03	25000	<2	<0.2	1.5	200	<0.2	660	20	0.06	
LL-BKST-01	50.1	0.88	F	2	<0.2	<0.4	3	<0.2	<0.2	<2	<0.02	9200	<1	<0.1	1.9	43	<0.1	470	9	0.04	
LL-BKST-48	69.4	2.45	M	1	<0.1	<0.2	3.6	<0.1	<0.1	<1	<0.01	15000	<0.6	<0.06	1.3	32	<0.06	480	16	0.05	
LL-BKST-47	66	2.44	M	1.4	<0.1	<0.2	2.8	<0.1	<0.1	<1	<0.01	9200	<0.6	<0.06	0.9	20	<0.06	410	12	0.05	
LL-BKST-57	63.4	2.19	M	2	<0.05	<0.1	2.1	<0.05	<0.5	<0.5	<0.005	9400	<0.3	<0.03	1	20	<0.03	400	5.9	0.03	
LL-BKST-56	62.2	1.83	M	1.6	<0.05	<0.1	2.9	<0.05	<0.5	<0.5	0.006	12000	<0.3	<0.03	1.6	40	0.04	470	8	0.03	
LL-BKST-24	60.2	1.72	M	0.7	<0.05	<0.1	3.7	<0.05	<0.5	<0.5	0.007	14000	<0.3	<0.03	2.3	40	<0.03	520	7	0.06	
LL-BKST-50	59.4	1.55	M	<0.6	<0.1	<0.2	3	<0.1	<0.1	<1	<0.01	6800	<0.6	<0.06	1	23	<0.06	390	8.1	0.03	
LL-BKST-25	57.6	1.38	M	<0.6	<0.1	<0.2	1.9	<0.1	<0.1	<1	<0.01	7800	<0.6	<0.06	1.3	25	<0.06	450	6.3	0.05	
LL-BKST-54	55	1.28	M	0.7	<0.1	<0.2	2.2	<0.1	<0.1	<1	<0.01	14000	<0.6	<0.06	1.3	23	<0.06	450	21	0.08	
LL-BKST-51	54.4	1.19	M	1.2	<0.1	<0.2	5.9	<0.1	<0.1	<1	<0.01	16000	<0.6	<0.06	1.6	47	<0.06	490	15	0.05	
LL-BKST-26	53.9	1.23	M	0.8	<0.1	<0.2	5.7	<0.1	<0.1	<1	<0.01	18000	<0.6	<0.06	1.2	37	<0.06	560	9.9	0.04	
Fathead minnow																					
LL-FTHD-28	69.5	4.72	-	1.9	<0.1	<0.2	4.3	<0.1	<0.1	<0.1	<0.01	7200	<0.6	<0.06	0.7	23	<0.06	370	5.8	0.03	
LL-FTHD-30	67.7	4.1	-	7.4	<0.1	<0.2	5	<0.1	<0.1	<0.1	0.02	4300	<0.6	<0.06	0.8	110	<0.06	320	9.1	0.05	
LL-FTHD-27	67.4	3.79	-	1.1	<0.1	<0.2	7.6	<0.1	<0.1	<0.1	<0.01	14000	<0.6	<0.06	0.6	17	<0.06	400	7.7	0.04	
LL-FTHD-31	67.4	3.82	-	2.3	<0.1	0.2	4.1	<0.1	<0.1	<0.1	<0.01	4800	<0.6	<0.06	0.6	27	<0.06	330	6.8	0.03	
LL-FTHD-34	65.5	3.61	-	4.2	<0.1	<0.2	6.4	<0.1	<0.1	<0.1	0.01	4300	<0.6	<0.06	0.9	150	<0.06	310	9.6	0.08	
LL-FTHD-32	65	3.51	-	1.4	<0.1	<0.2	9.3	<0.1	<0.1	<0.1	0.01	15000	<0.6	<0.06	0.7	17	<0.06	420	12	0.06	
LL-FTHD-33	63.3	2.71	-	21	<0.1	2.3	14	<0.1	<0.1	<0.1	0.02	13000	<0.6	<0.06	1.1	71	0.15	540	9.9	0.05	
LL-FTHD-40	63	3.04	-	0.9	<0.1	<0.2	5.9	<0.1	<0.1	<0.1	<0.01	6000	<0.6	<0.06	0.7	45	<0.06	400	7.6	0.03	
LL-FTHD-35	62.5	3.19	-	4.6	<0.1	<0.2	8.6	<0.1	<0.1	<0.1	<0.01	10000	<0.6	<0.06	0.8	140	<0.06	380	11	0.04	
LL-FTHD-29	61.7	3.62	-	3.6	<0.1	<0.2	16	<0.1	<0.1	<0.1	0.01	13000	<0.6	<0.06	1	100	<0.06	390	16	0.07	
LL-FTHD-41	61.4	3.1	-	2.1	<0.1	<0.2	12	<0.1	<0.1	<0.1	0.01	12000	<0.6	<0.06	1.3	260	<0.06	380	9.7	0.06	
LL-FTHD-42	61.4	2.93	-	0.9	<0.1	<0.2	11	<0.1	<0.1	<0.1	<0.01	13000	<0.6	<0.06	0.8	51	<0.06	420	15	0.04	
LL-FTHD-43	61.4	2.79	-	0.9	<0.1	<0.2	14	<0.1	<0.1	<0.1	0.01	13000	<0.6	<0.06	0.7	48	<0.06	440	13	0.04	
LL-FTHD-39	60.9	2.89	-	<0.6	<0.1	<0.2	3.8	<0.1	<0.1	<0.1	<0.01	4800	<0.6	<0.06	0.7	29	<0.06	350	4.2	0.04	
LL-FTHD-45	59.8	2.62	-	0.3	<0.05	<0.1	11	<0.05	<0.5	<0.5	0.005	6300	<0.3	<0.03	0.51	16	<0.03	380	5.1	0.03	
LL-FTHD-38	59	2.52	-	<0.6	<0.1	<0.2	5.4	<0.1	<0.1	<0.1	<0.01	7900	<0.6	<0.06	0.8	31	<0.06	390	17	0.04	
LL-FTHD-44	58.8	2.83	-	2.1	<0.1	<0.2	10	<0.1	<0.1	<0.1	0.01	12000	<0.6	<0.06	0.8	110	<0.06	390	14	0.06	
LL-FTHD-15	35.8	0.47	-	<0.3	<0.5	<1	4	<0.5	<0.5	<0.5	<0.05	6200	<0.3	<0.3	1	<0.3	<0.3	390	9	0.02	
LL-FTHD-17	34	0.36	-	31	<0.5	<1	7	<0.5	<0.5	<0.5	<0.05	6500	<0.3	<0.3	1.1	120	<0.3	420	10	0.02	
LL-FTHD-16	31.6	0.32	-	5	<0.5	<1	7	<0.5	<0.5	<0.5	<0.05	12000	<0.3	<0.3	1.5	42	<0.3	410	8	0.02	
MWQSOG guideline																				0.5	

Table A5-1. - Continued -

Fish ID	Supporting information			Metal Concentration (µg/g w.w.)														Nutrient
	Length (mm)	Weight (g)	Sex	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Tungsten	Uranium	Vanadium	Zinc	Phosphorus	
Brook stickleback																		
LL-BKST-36	72	3.09	F	<0.1	2800	<0.2	<0.1	490	5.3	<0.006	<0.6	<1	0.002	<0.01	<0.1	35	6600	
LL-BKST-46	70.3	2.5	F	<0.1	3100	<0.2	<0.1	970	4.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	38	5500	
LL-BKST-49	69.5	2.5	F	<0.1	2900	<0.2	<0.1	1400	7.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	56	8500	
LL-BKST-67	61	1.64	F	<0.1	3200	0.2	<0.1	1000	6.9	<0.006	<0.6	1	0.002	<0.01	<0.1	25	4800	
LL-BKST-23	58.7	1.31	F	<0.1	3000	<0.2	<0.1	1200	3.9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	24	5600	
LL-BKST-53	58	1.22	F	<0.1	2600	<0.2	<0.1	1400	9.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	53	8500	
LL-BKST-64	57	1.3	F	<0.1	3000	<0.2	<0.1	1000	6.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	26	4900	
LL-BKST-68	56	1.15	F	<0.1	2900	<0.2	<0.1	1400	11	<0.006	<0.6	<1	<0.002	<0.01	<0.1	51	9400	
LL-BKST-55	51.3	0.95	F	<0.3	2500	<0.5	<0.3	1700	14	<0.02	<2	<3	0.016	<0.03	<0.3	84	13000	
LL-BKST-01	50.1	0.88	F	<0.2	2900	<0.4	<0.2	1300	5.2	<0.01	<1	<2	<0.004	<0.02	<0.2	31	6000	
LL-BKST-48	69.4	2.45	M	<0.1	2500	<0.2	<0.1	1200	7.9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	54	9000	
LL-BKST-47	66	2.44	M	<0.1	2900	<0.2	<0.1	1000	4.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	27	6100	
LL-BKST-57	63.4	2.19	M	<0.05	2900	0.2	<0.05	1200	5.4	<0.003	<0.3	<0.5	<0.001	<0.005	<0.05	37	6600	
LL-BKST-56	62.2	1.83	M	<0.3	3000	0.2	<0.05	1200	6.5	<0.003	<0.3	<0.5	0.001	<0.005	<0.05	46	8400	
LL-BKST-24	60.2	1.72	M	<0.3	3000	0.3	<0.05	1500	9	<0.003	<0.3	<0.5	<0.001	<0.005	<0.05	51	9100	
LL-BKST-50	59.4	1.55	M	<0.1	3100	0.2	<0.1	1000	4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	30	5300	
LL-BKST-25	57.6	1.38	M	<0.1	3300	0.2	<0.1	1200	4.6	<0.006	<0.6	<1	<0.002	<0.01	<0.1	25	5900	
LL-BKST-54	55	1.28	M	<0.1	2800	0.2	<0.1	1400	7	<0.006	<0.6	<1	0.005	<0.01	<0.1	41	9000	
LL-BKST-51	54.4	1.19	M	<0.1	2700	0.2	<0.1	1500	9.4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	53	9600	
LL-BKST-26	53.9	1.23	M	<0.3	2600	<0.2	<0.1	1500	12	<0.006	<0.6	<1	<0.002	<0.01	<0.1	61	11000	
Fathead minnow																		
LL-FTHD-28	69.5	4.72	-	<0.1	3100	<0.2	<0.1	430	3.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	26	5200	
LL-FTHD-30	67.7	4.1	-	<0.1	3200	<0.2	<0.1	540	2.9	<0.006	<0.6	<1	0.048	<0.01	<0.1	22	3900	
LL-FTHD-27	67.4	3.79	-	<0.1	2400	<0.2	<0.1	470	8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	49	7500	
LL-FTHD-31	67.4	3.82	-	<0.1	3000	<0.2	<0.1	510	3.1	<0.006	<0.6	<1	0.002	<0.01	<0.1	18	4100	
LL-FTHD-34	65.5	3.61	-	<0.1	3100	<0.2	<0.1	410	2.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	21	3600	
LL-FTHD-32	65	3.51	-	<0.1	2500	0.2	<0.1	620	8.7	<0.006	<0.6	<1	<0.002	<0.01	<0.1	32	8800	
LL-FTHD-33	63.3	2.71	-	0.1	2500	<0.2	<0.1	570	8.5	<0.006	<0.6	2	0.003	<0.01	0.1	36	7300	
LL-FTHD-40	63	3.04	-	<0.1	3500	<0.2	<0.1	700	4.3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	30	5000	
LL-FTHD-35	62.5	3.19	-	<0.1	3000	<0.2	<0.1	560	6.4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	30	6300	
LL-FTHD-29	61.7	3.62	-	<0.1	2700	0.2	<0.1	920	7.2	<0.006	<0.6	<1	0.003	<0.01	<0.1	23	8100	
LL-FTHD-41	61.4	3.1	-	0.2	3000	0.2	<0.1	940	7.6	<0.006	<0.6	<1	0.016	<0.01	<0.1	35	7100	
LL-FTHD-42	61.4	2.93	-	0.1	2900	0.2	<0.1	1000	7.7	<0.006	<0.6	<1	<0.002	<0.01	<0.1	37	7900	
LL-FTHD-43	61.4	2.79	-	<0.3	3300	0.2	<0.1	1000	8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	35	8100	
LL-FTHD-39	60.9	2.89	-	<0.1	3500	0.2	<0.1	790	2.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	23	4600	
LL-FTHD-45	59.8	2.62	-	<0.05	3200	0.2	<0.05	830	9.6	<0.003	<0.3	<0.5	<0.001	<0.005	<0.05	20	5100	
LL-FTHD-38	59	2.52	-	<0.1	3300	<0.2	<0.1	860	5.4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	31	5900	
LL-FTHD-44	58.8	2.83	-	<0.1	2800	0.3	<0.1	940	7.9	<0.006	<0.6	<1	0.002	<0.01	<0.1	41	7600	
LL-FTHD-15	35.8	0.47	-	<0.5	2800	<1	<0.5	540	4.3	<0.03	<3	<5	<0.01	<0.05	<0.5	33	5200	
LL-FTHD-17	34	0.36	-	<0.5	3400	<1	<0.5	930	3.9	<0.03	<3	<5	<0.01	<0.05	<0.5	36	5400	
LL-FTHD-16	31.6	0.32	-	<0.5	2800	<1	<0.5	1300	8.4	<0.03	<3	<5	<0.01	<0.05	<0.5	60	7800	

MWQSOG guideline

Table A5-2. Detailed results of analysis of metals in whole bodies of forage fish collected in Maw Lake. Values in red exceeded the Manitoba aquatic life tissue residue guideline for human consumers.

Fish ID	Supporting Information				Metal Concentration (µg/g w.w.)																																		
	Length (mm)	Weight (g)	Sex		Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury																		
Brook stickleback																																							
ML-BKSB-06	48.1	0.88	F	3.7	<0.1	<0.2	2.7	<0.1	<0.1	<0.1	<0.1	0.01	7300	<0.6	<0.06	2.3	55	<0.06	360	9.9	0.04																		
ML-BKSB-13	40.2	0.55	F	8	<0.3	<0.5	6	<0.3	<0.3	<0.3	<0.3	<0.03	13000	<2	<0.2	1.5	55	<0.2	480	20	<0.01																		
ML-BKSB-12	39.7	0.47	F	19	<0.1	<0.2	14	<0.1	<0.1	<0.1	<0.1	0.03	15000	<0.6	<0.06	2.7	150	<0.06	430	28	0.02																		
ML-BKSB-19	38.8	0.39	F	6	<0.3	<0.5	4	<0.3	<0.3	<0.3	<0.3	<0.03	15000	<2	<0.2	1.4	48	<0.2	590	28	0.08																		
ML-BKSB-21	37.7	0.4	F	<2	<0.3	<0.5	4	<0.3	<0.3	<0.3	<0.3	<0.03	8900	<2	<0.2	2.2	33	<0.2	500	22	0.03																		
ML-BKSB-28	37.7	0.4	F	<3	<0.5	<1	12	<0.5	<0.5	<0.5	<0.5	<0.05	15000	<3	<0.3	2.3	120	<0.3	400	21	0.06																		
ML-BKSB-14	37.3	0.45	F	10	<0.5	<1	8	<0.5	<0.5	<0.5	<0.5	<0.05	12000	<3	<0.3	1.7	81	<0.3	490	26	0.03																		
ML-BKSB-20	37.3	0.41	F	<3	<0.5	<1	<3	<0.5	<0.5	<0.5	<0.5	<0.05	8400	<3	<0.3	2	120	<0.3	540	25	0.06																		
ML-BKSB-16	36.9	0.4	F	6	<0.5	<1	11	<0.5	<0.5	<0.5	<0.5	<0.05	24000	<3	<0.3	1.8	50	<0.3	660	80	0.05																		
ML-BKSB-24	35.2	0.35	F	9	<0.5	<1	13	<0.5	<0.5	<0.5	<0.5	<0.05	18000	<3	<0.3	1	50	<0.3	560	28	0.04																		
ML-BKSB-28	73.1	3.36	M	2	<0.1	<0.2	4.9	<0.1	<0.1	<0.1	<0.1	<0.01	14000	<0.6	<0.06	2.2	64	<0.06	460	32	0.06																		
ML-BKSB-67	72.4	3.18	M	1	<0.1	<0.2	3.8	<0.1	<0.1	<0.1	<0.1	<0.01	8700	<0.6	<0.06	2.1	37	<0.06	380	13	0.04																		
ML-BKSB-65	71.8	3.53	M	2.3	<0.1	<0.2	5	<0.1	<0.1	<0.1	<0.1	<0.01	14000	<0.6	<0.06	1.3	69	<0.06	490	19	0.06																		
ML-BKSB-66	70	3.74	M	1.5	<0.1	<0.2	3	<0.1	<0.1	<0.1	<0.1	<0.01	5000	<0.6	<0.06	1.7	45	<0.06	300	13	0.03																		
ML-BKSB-59	69.7	3	M	0.9	<0.1	<0.2	3.2	<0.1	<0.1	<0.1	<0.1	<0.01	8500	<0.6	<0.06	2.6	38	<0.06	360	13	0.05																		
ML-BKSB-08	55	1.33	M	8.9	<0.1	<0.2	2.5	<0.1	<0.1	<0.1	<0.1	<0.01	8300	<0.6	<0.06	1.3	77	<0.06	420	7.7	<0.01																		
ML-BKSB-02	54.6	1.36	M	0.8	<0.1	<0.2	5	<0.1	<0.1	<0.1	<0.1	<0.01	15000	<0.6	<0.06	2.3	200	<0.06	510	6.9	0.04																		
ML-BKSB-07	50.2	1	M	9.7	<0.1	<0.2	5.5	<0.1	<0.1	<0.1	<0.1	0.02	11000	<0.6	<0.06	2.5	110	<0.06	430	12	0.03																		
ML-BKSB-03	48.7	0.88	M	2	<0.3	<0.5	6	<0.3	<0.3	<0.3	<0.3	<0.03	13000	<2	<0.2	2.4	58	<0.2	480	8	0.07																		
ML-BKSB-18	44	0.73	M	3	<0.3	<0.5	13	<0.3	<0.3	<0.3	<0.3	<0.03	19000	<2	<0.2	1.1	45	<0.2	530	27	0.03																		
Fathead minnow																																							
ML-FTHD-44	64.2	3.49	F	2.1	<0.1	<0.2	13	<0.1	<0.1	<0.1	<0.1	<0.01	13000	<0.6	<0.06	0.8	73	<0.06	360	13	0.06																		
ML-FTHD-63	62.5	3.42	F	0.8	<0.1	<0.2	7.7	<0.1	<0.1	<0.1	<0.1	<0.01	11000	<0.6	<0.06	0.7	23	<0.06	360	7.6	0.03																		
ML-FTHD-62	62.3	3.18	F	2.7	<0.1	<0.2	15	<0.1	<0.1	<0.1	<0.1	<0.01	10000	<0.6	<0.06	0.7	92	<0.06	360	31	0.05																		
ML-FTHD-45	61.2	2.97	F	0.8	<0.1	<0.2	7.5	<0.1	<0.1	<0.1	<0.1	<0.01	4100	<0.6	<0.06	0.6	25	<0.06	280	5.4	0.03																		
ML-FTHD-52	70.5	4.99	M	1.9	<0.1	<0.2	16	<0.1	<0.1	<0.1	<0.1	<0.01	5900	<0.6	<0.06	0.6	70	<0.06	300	7.3	0.02																		
ML-FTHD-46	67.6	4.18	M	2.1	<0.1	<0.2	17	<0.1	<0.1	<0.1	<0.1	<0.01	17000	<0.6	<0.06	0.9	55	<0.06	450	13	0.03																		
ML-FTHD-49	67.5	4.31	M	6.4	<0.1	<0.2	6.8	<0.1	<0.1	<0.1	<0.1	0.01	12000	<0.6	<0.06	1	87	<0.06	400	14	0.04																		
ML-FTHD-48	66.9	3.89	M	<0.6	<0.1	<0.2	5.3	<0.1	<0.1	<0.1	<0.1	<0.01	7100	<0.6	<0.06	0.8	24	<0.06	350	6	0.03																		
ML-FTHD-55	65.2	4.08	M	3.3	<0.1	<0.2	7.9	<0.1	<0.1	<0.1	<0.1	<0.01	9500	<0.6	<0.06	0.8	94	<0.06	360	8.6	0.04																		
ML-FTHD-53	64.4	3.55	M	<0.6	<0.1	<0.2	8.9	<0.1	<0.1	<0.1	<0.1	<0.01	11000	<0.6	<0.06	0.7	37	<0.06	390	6.5	0.04																		
ML-FTHD-50	64.2	3.74	M	<0.6	<0.1	<0.2	14	<0.1	<0.1	<0.1	<0.1	<0.01	14000	<0.6	<0.06	1	79	<0.06	450	13	0.03																		
ML-FTHD-57	64.2	3.34	M	0.9	<0.1	<0.2	12	<0.1	<0.1	<0.1	<0.1	<0.01	8900	<0.6	<0.06	0.7	39	<0.06	340	9.6	0.02																		
ML-FTHD-60	64	3.49	M	3.8	<0.1	<0.2	16	<0.1	<0.1	<0.1	<0.1	0.01	8800	<0.6	<0.06	0.9	120	<0.06	370	17	0.03																		
ML-FTHD-64	63.9	3.38	M	1.6	<0.1	<0.2	7.6	<0.1	<0.1	<0.1	<0.1	0.01	7600	<0.6	<0.06	0.7	64	<0.06	280	7.9	0.06																		
ML-FTHD-47	63.5	3.99	M	<0.6	<0.1	<0.2	12	<0.1	<0.1	<0.1	<0.1	<0.01	16000	<0.6	<0.06	0.8	36	<0.06	440	9.4	0.04																		
ML-FTHD-61	63.3	3.92	M	<0.6	<0.1	<0.2	17	<0.1	<0.1	<0.1	<0.1	<0.01	15000	<0.6	<0.06	0.9	34	<0.06	480	10	0.04																		
ML-FTHD-54	62.2	3.15	M	0.7	<0.1	<0.2	7.2	<0.1	<0.1	<0.1	<0.1	<0.01	4400	<0.6	<0.06	0.7	26	<0.06	280	5.8	0.03																		
ML-FTHD-51	61.2	2.97	M	4.4	<0.1	<0.2	33	<0.1	<0.1	<0.1	<0.1	0.02	6600	<0.6	<0.06	1	150	<0.06	320	19	0.04																		
ML-FTHD-56	60.4	2.88	M	<0.6	<0.1	<0.2	9	<0.1	<0.1	<0.1	<0.1	<0.01	4600	<0.6	<0.06	0.7	28	<0.06	310	7.5	0.03																		
ML-FTHD-68	60.1	3.25	M	2.7	<0.1	<0.2	5.8	<0.1	<0.1	<0.1	<0.1	<0.01	7400	<0.6	<0.06	0.8	27	<0.06	330	7.8	0.03																		
MWOSOG guideline																				0.5																			

Table A5-2. - Continued -

Fish ID	Supporting Information			Metal Concentration (µg/g w.w.)														Nutrient	
	Length (mm)	Weight (g)	Sex	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Tungsten	Uranium	Vanadium	Zinc		Phosphorus
Brook stickleback																			
ML-BKSB-06	48.1	0.88	F	<0.1	<0.1	3100	0.2	<0.1	1100	6.2	<0.006	<0.6	<1	<0.002	<0.01	<0.1	26	4900	
ML-BKSB-13	40.2	0.55	F	<0.3	<0.3	2800	<0.5	<0.3	1200	8.3	<0.02	<2	<3	<0.005	<0.03	<0.3	34	7600	
ML-BKSB-12	39.7	0.47	F	<0.1	0.2	2500	0.2	<0.1	1200	12	<0.006	<0.6	2	<0.002	<0.01	<0.1	41	7800	
ML-BKSB-19	38.8	0.39	F	<0.3	<0.3	2700	<0.5	<0.3	1300	9	<0.02	<2	<3	<0.005	<0.03	<0.3	51	9500	
ML-BKSB-21	37.7	0.4	F	<0.3	<0.3	3300	<0.5	<0.3	1100	5.3	<0.02	<2	<3	<0.005	<0.03	<0.3	31	6800	
ML-BKSB-28	37.7	0.4	F	<0.5	<0.5	2900	<1	<0.5	1400	9.5	<0.03	<3	<5	<0.01	<0.05	<0.5	61	8100	
ML-BKSB-14	37.3	0.45	F	<0.5	<0.5	2900	<1	<0.5	1300	8.2	<0.03	<3	<5	<0.01	<0.05	<0.5	22	6200	
ML-BKSB-20	37.3	0.41	F	<0.5	<0.5	3100	<1	<0.5	1200	4.9	<0.03	<3	<5	<0.01	<0.05	<0.5	37	5700	
ML-BKSB-16	36.9	0.4	F	<0.5	<0.5	2300	<1	<0.5	1300	15	<0.03	<3	<5	<0.01	<0.05	<0.5	90	13000	
ML-BKSB-24	35.2	0.35	F	<0.5	<0.5	2800	<1	<0.5	1300	11	<0.03	<3	<5	<0.01	<0.05	<0.5	48	9400	
ML-BKSB-58	73.1	3.36	M	<0.1	<0.1	2400	<0.2	<0.1	1100	7.9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	50	8400	
ML-BKSB-67	72.4	3.18	M	<0.1	<0.1	2700	<0.2	<0.1	570	5.3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	35	5900	
ML-BKSB-65	71.8	3.53	M	<0.1	<0.3	2800	<0.2	<0.1	950	8.2	<0.006	<0.6	<1	<0.002	<0.01	<0.1	42	8900	
ML-BKSB-66	70	3.74	M	<0.1	<0.1	2600	<0.2	<0.1	910	3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	26	4000	
ML-BKSB-59	69.7	3	M	<0.1	<0.1	2600	<0.2	<0.1	680	5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	37	5600	
ML-BKSB-08	55	1.33	M	<0.1	<0.1	3000	<0.2	<0.1	1100	5.7	<0.006	<0.6	<1	<0.002	<0.01	<0.1	31	5700	
ML-BKSB-02	54.6	1.36	M	<0.1	<0.5	2800	<0.2	<0.1	1400	11	<0.006	<0.6	<1	0.012	<0.01	<0.1	42	8600	
ML-BKSB-07	50.2	1	M	<0.1	<0.1	2800	<0.2	<0.1	1100	9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	43	6100	
ML-BKSB-03	48.7	0.88	M	<0.3	<0.3	2800	<0.5	<0.3	1200	10	<0.02	<2	<3	<0.005	<0.03	<0.3	36	8700	
ML-BKSB-18	44	0.73	M	<0.3	<0.3	2700	<0.5	<0.3	1500	13	<0.02	<2	<3	<0.005	<0.03	<0.3	54	10000	
Fathead minnow																			
ML-FTHD-44	64.2	3.49	F	<0.1	<0.1	2300	<0.2	<0.1	540	9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	21	7300	
ML-FTHD-63	62.5	3.42	F	<0.1	<0.1	2200	<0.2	<0.1	500	7.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	21	6900	
ML-FTHD-62	62.3	3.18	F	<0.1	<0.1	2500	<0.2	<0.1	510	7.2	<0.006	<0.6	<1	<0.002	<0.01	<0.1	30	6000	
ML-FTHD-45	61.2	2.97	F	<0.1	<0.1	2500	<0.2	<0.1	410	3.3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	29	3600	
ML-FTHD-52	70.5	4.99	M	<0.1	<0.1	2600	<0.2	<0.1	470	4.7	<0.006	<0.6	<1	<0.002	<0.01	<0.1	16	4200	
ML-FTHD-46	67.6	4.18	M	<0.1	<0.1	2400	0.2	<0.1	660	12	<0.006	<0.6	<1	<0.002	<0.01	<0.1	34	9200	
ML-FTHD-49	67.5	4.31	M	<0.1	<0.1	2500	<0.2	<0.1	620	7.3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	27	7200	
ML-FTHD-48	66.9	3.89	M	<0.1	<0.1	2800	<0.2	<0.1	420	4.4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	23	5000	
ML-FTHD-55	65.2	4.08	M	<0.1	<0.1	2900	0.2	<0.1	650	6.6	<0.006	<0.6	<1	<0.002	<0.01	<0.1	27	6100	
ML-FTHD-53	64.4	3.55	M	<0.1	<0.1	2700	<0.2	<0.1	630	8.1	<0.006	<0.6	<1	<0.002	<0.01	<0.1	34	7400	
ML-FTHD-50	64.2	3.74	M	<0.1	<0.1	2600	<0.2	<0.1	570	11	<0.006	<0.6	<1	0.008	<0.01	<0.1	34	8100	
ML-FTHD-57	64.2	3.34	M	<0.1	<0.1	2500	<0.2	<0.1	450	8.3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	21	5800	
ML-FTHD-60	64	3.49	M	<0.1	<0.1	2700	<0.2	<0.1	450	7.1	<0.006	<0.6	<1	<0.002	<0.01	<0.1	21	5500	
ML-FTHD-64	63.9	3.38	M	<0.1	<0.1	2300	<0.2	<0.1	380	5.1	<0.006	<0.6	<1	<0.002	<0.01	<0.1	16	5100	
ML-FTHD-47	63.5	3.99	M	<0.1	<0.3	2600	<0.2	<0.1	670	12	<0.006	<0.6	<1	<0.002	<0.01	<0.1	31	9500	
ML-FTHD-61	63.3	3.92	M	<0.1	<0.1	2500	<0.2	<0.1	730	11	<0.006	<0.6	<1	<0.002	<0.01	<0.1	40	8700	
ML-FTHD-54	62.2	3.15	M	<0.1	<0.1	2500	<0.2	<0.1	330	4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	27	3800	
ML-FTHD-51	61.2	2.97	M	<0.1	<0.1	2500	<0.2	<0.1	500	8.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	19	4200	
ML-FTHD-56	60.4	2.88	M	<0.1	<0.1	2800	<0.2	<0.1	340	4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	26	4000	
ML-FTHD-68	60.1	3.25	M	<0.1	<0.1	2800	<0.2	<0.1	570	5.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	21	5400	

MWQSOG guideline

Table A5-3. - Continued -

Fish ID	Supporting Information			Metal Concentration (µg/g w.w.)																Nutrient
	Length (mm)	Weight (g)	Sex	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Tungsten	Uranium	Vanadium	Zinc	Phosphorus		
Central mudminnow																				
VL-MDMN-105	113.8	17.96	F	<0.1	<0.1	2600	0.2	<0.1	790	2.6	<0.006	<0.6	<1	<0.002	<0.01	<0.1	110	3200		
VL-MDMN-83	110.1	14.52	F	<0.1	<0.1	2700	0.3	<0.1	840	6.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	370	6200		
VL-MDMN-80	108	15.02	F	<0.1	<0.1	2500	0.2	<0.1	630	5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	120	5100		
VL-MDMN-85	107.8	14.37	F	<0.1	<0.1	2500	0.2	<0.1	690	3.6	<0.006	<0.6	<1	<0.002	<0.01	<0.1	150	4000		
VL-MDMN-82	107.3	14.04	F	<0.1	<0.1	3000	<0.2	<0.1	770	1.9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	80	2900		
VL-MDMN-87	86.6	7.16	F	<0.1	<0.1	3200	<0.2	<0.1	730	4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	37	4700		
VL-MDMN-81	84	6.57	F	<0.1	<0.1	2900	<0.2	<0.1	430	3.2	<0.006	<0.6	<1	<0.002	<0.01	<0.1	53	3800		
VL-MDMN-88	81.9	5.95	F	<0.1	<0.1	2900	<0.2	<0.1	960	3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	82	3800		
VL-MDMN-95	72.9	3.99	F	<0.1	<0.1	2900	<0.2	<0.1	710	5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	67	5300		
VL-MDMN-90	109.1	14.87	M	<0.1	<0.1	2700	<0.2	<0.1	500	2.6	<0.006	<0.6	<1	<0.002	<0.01	<0.1	60	3100		
VL-MDMN-91	108.6	14.43	M	<0.1	<0.1	3300	<0.2	<0.1	870	3.9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	74	4500		
VL-MDMN-84	103.3	13.31	M	<0.1	<0.1	2600	<0.2	<0.1	510	3.9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	99	4200		
VL-MDMN-79	100.3	12.58	M	<0.1	0.2	2700	<0.2	<0.1	560	3.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	69	4300		
VL-MDMN-92	95	10.35	M	<0.1	<0.1	3100	0.2	<0.1	930	2.9	<0.006	<0.6	3	<0.002	<0.01	<0.1	140	3800		
VL-MDMN-96	88.3	6.74	M	<0.1	<0.1	3100	<0.2	<0.1	760	6.1	<0.006	<0.6	<1	<0.002	<0.01	<0.1	140	5700		
VL-MDMN-104	88.3	7.84	M	<0.1	<0.1	3100	<0.2	<0.1	530	4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	57	4800		
VL-MDMN-89	86.1	7.14	M	<0.1	<0.1	3100	<0.2	<0.1	750	5.2	<0.006	<0.6	<1	<0.002	<0.01	<0.1	58	5800		
VL-MDMN-93	85	6.78	M	<0.1	<0.1	2900	<0.2	<0.1	750	6.2	<0.006	<0.6	<1	<0.002	<0.01	<0.1	110	6300		
VL-MDMN-86	76.7	5.02	M	<0.1	<0.1	2900	<0.2	<0.1	570	6	<0.006	<0.6	<1	<0.002	<0.01	<0.1	55	5800		
VL-MDMN-94	68.7	3.52	M	<0.1	<0.1	2500	<0.2	<0.1	620	4.7	<0.006	<0.6	<1	<0.002	<0.01	<0.1	54	4800		
Fathead minnow																				
VL-FTHD-101	111	15.8	F	<0.1	<0.1	2900	0.2	<0.1	330	0.9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	14	2600		
VL-FTHD-100	110.7	15.38	F	<0.1	<0.1	3100	<0.2	<0.1	390	0.9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	14	2600		
VL-FTHD-119	109.2	15.08	F	<0.05	<0.05	3300	0.2	<0.05	360	2	<0.003	<0.3	<0.5	0.001	<0.005	<0.05	20	4000		
VL-FTHD-114	105.5	16.11	F	<0.1	<0.1	3200	<0.2	<0.1	250	0.2	<0.006	<0.6	<1	<0.002	<0.01	<0.1	13	1900		
VL-FTHD-98	68.5	3.77	F	<0.1	<0.3	2600	0.3	<0.1	590	8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	51	8200		
VL-FTHD-109	65.1	3.64	F	<0.1	<0.1	2300	0.2	<0.1	370	4.7	<0.006	<0.6	<1	<0.002	<0.01	<0.1	15	4400		
VL-FTHD-99	65	3.31	F	<0.1	<0.1	2600	0.3	<0.1	610	6.4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	43	7300		
VL-FTHD-116	65	3.57	F	<0.1	<0.3	2800	<0.2	<0.1	470	4.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	17	4000		
VL-FTHD-115	64.5	3.7	F	<0.1	<0.1	3000	<0.2	<0.1	510	5.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	18	4500		
VL-FTHD-108	64	3.54	F	<0.1	<0.1	2300	0.2	<0.1	470	4.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	17	4000		
VL-FTHD-110	61.9	3.25	F	<0.1	<0.1	2200	<0.2	<0.1	510	5.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	18	4500		
VL-FTHD-113	61.4	3.67	F	<0.1	<0.1	2100	<0.2	<0.1	740	14	<0.006	<0.6	<1	0.003	<0.01	<0.1	29	8900		
VL-FTHD-106	74	6.36	M	<0.1	<0.1	2900	0.3	<0.1	500	6.4	<0.006	<0.6	1	0.003	0.01	<0.1	27	5400		
VL-FTHD-118	70.8	5.47	M	<0.1	<0.1	3000	<0.2	<0.1	630	5	<0.006	<0.6	1	<0.002	0.01	<0.1	21	4400		
VL-FTHD-117	63.1	3.63	M	<0.1	0.1	2500	0.2	<0.1	440	3.3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	13	3700		
VL-FTHD-97	62.3	3.62	M	<0.1	<0.1	2700	<0.2	<0.1	440	4.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	22	4100		
VL-FTHD-107	62.2	3.21	M	<0.1	<0.1	2900	<0.2	<0.1	660	6.9	<0.006	<0.6	<1	<0.002	<0.01	<0.1	22	3900		
VL-FTHD-112	62.1	3.54	M	<0.1	<0.1	2400	0.2	<0.1	650	11	<0.006	<0.6	<1	0.002	<0.01	<0.1	31	8300		
VL-FTHD-111	61.5	3.24	M	<0.1	<0.1	3200	<0.2	<0.1	480	4.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	21	4000		

MWQSOG guideline

Table A5-4. Detailed results of analysis of metals in whole bodies of forage fish collected in Tern Lake. Values in red exceeded the Manitoba aquatic life tissue residue guideline for human consumers.

Fish ID	Supporting Information				Metal Concentration (µg/g w.w.)																	
	Length (mm)	Weight (g)	Sex		Aluminum	Antimony	Arsenic	Barium	Beryllium	Bismuth	Boron	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	
Brook stickleback																						
TL-BKSB-131	69.4	2.87	F		100	<0.05	0.5	3.5	<0.05	<0.05	<0.5	0.1	16000	<0.3	0.1	5.6	260	0.3	540	23	0.11	
TL-BKSB-133	52.7	1.03	F		8.1	<0.1	0.2	2.6	<0.1	<0.1	<1	<0.01	7200	<0.6	<0.06	1.9	59	<0.06	400	11	0.04	
TL-BKSB-141	50.9	1.23	F		5.2	<0.1	0.3	5.4	<0.1	<0.1	<1	<0.01	22000	<0.6	<0.06	1.1	42	<0.06	570	13	0.09	
TL-BKSB-143	55.6	1.21	F		2.9	<0.1	0.2	2.6	<0.1	<0.1	<1	<0.01	9900	<0.6	<0.06	0.8	19	<0.06	450	7.6	0.03	
TL-BKSB-145	35.9	0.41	F		4	<0.5	<1	4	<0.5	<0.5	<5	<0.05	9700	<3	<0.3	1.2	38	<0.3	400	10	0.05	
TL-BKSB-146	53.5	1.17	F		1	<0.1	0.2	3.5	<0.1	<0.1	<1	<0.01	9100	<0.6	<0.06	0.7	12	<0.06	460	11	0.04	
TL-BKSB-148	62.3	1.86	F		1.6	<0.1	<0.2	1.5	<0.1	<0.1	<1	<0.01	7900	<0.6	<0.06	2.3	28	<0.06	390	11	0.08	
TL-BKSB-150	53	1.17	F		1.5	<0.1	0.3	1.8	<0.1	<0.1	<1	<0.01	8900	<0.6	<0.06	0.8	22	<0.06	420	12	0.06	
TL-BKSB-132	60.2	1.63	M		2.5	<0.1	<0.2	3.9	<0.1	<0.1	<1	<0.01	17000	<0.6	<0.06	1.4	38	<0.06	480	14	0.06	
TL-BKSB-134	54.6	1.13	M		0.7	<0.1	0.3	9.9	<0.1	<0.1	<1	<0.01	18000	<0.6	<0.06	1.4	12	<0.06	540	24	0.05	
TL-BKSB-135	69.4	2.75	M		<0.6	<0.1	<0.2	1.6	<0.1	<0.1	<1	<0.01	11000	<0.6	<0.06	0.7	19	<0.06	430	9.1	0.06	
TL-BKSB-136	59	1.51	M		4.7	<0.1	<0.2	1.4	<0.1	<0.1	<1	<0.01	9800	<0.6	<0.06	1.2	32	<0.06	470	6.1	0.07	
TL-BKSB-137	56.7	1.25	M		0.7	<0.1	0.4	3.7	<0.1	<0.1	<1	<0.01	18000	<0.6	<0.06	0.8	22	<0.06	490	18	0.04	
TL-BKSB-138	58.7	1.69	M		2	<0.1	0.2	2.1	<0.1	<0.1	<1	<0.01	6200	<0.6	<0.06	1	22	<0.06	370	6.2	0.08	
TL-BKSB-139	62.1	1.81	M		0.9	<0.1	<0.2	1	<0.1	<0.1	<1	<0.01	8800	<0.6	<0.06	1.7	18	<0.06	440	7.6	0.07	
TL-BKSB-140	51.3	1.06	M		1.1	<0.1	<0.2	3.8	<0.1	<0.1	<1	<0.01	11000	<0.6	<0.06	1.2	10	<0.06	480	14	0.06	
TL-BKSB-142	61.8	1.84	M		2.9	<0.1	0.3	2.7	<0.1	<0.1	<1	<0.01	15000	<0.6	<0.06	1.7	26	<0.06	450	11	0.07	
TL-BKSB-144	60	1.64	M		<0.6	<0.1	0.3	3	<0.1	<0.1	<1	<0.01	15000	<0.6	<0.06	1.5	33	<0.06	440	10	0.09	
TL-BKSB-147	56.7	1.54	M		0.9	<0.1	0.3	3.5	<0.1	<0.1	<1	<0.01	16000	<0.6	<0.06	0.8	170	<0.06	490	12	0.05	
TL-BKSB-149	65.3	2.18	M		1	<0.05	0.4	1.9	<0.05	<0.05	<0.5	<0.005	7700	<0.3	<0.03	1.5	13	<0.03	400	5.8	0.05	
WWOSOG guideline							3.5											0.5				0.5

Table A5-4. - Continued -

Fish ID	Supporting Information			Metal Concentration (µg/g w.w.)																Nutrient
	Length (mm)	Weight (g)	Sex	Molybdenum	Nickel	Potassium	Selenium	Silver	Sodium	Strontium	Thallium	Tin	Titanium	Tungsten	Uranium	Vanadium	Zinc	Phosphorus		
Brook stickleback																				
TL-BKSB-131	69.4	2.87	F	0.05	<0.3	2800	0.3	<0.05	1500	11	<0.003	<0.3	1.9	0.005	0.006	0.47	44	8500		
TL-BKSB-133	52.7	1.03	F	<0.1	<0.1	3200	<0.2	<0.1	1100	6.2	<0.006	<0.6	<1	<0.002	<0.01	<0.1	32	5500		
TL-BKSB-141	50.9	1.23	F	<0.1	<0.1	2700	<0.2	<0.1	1500	17	<0.006	<0.6	<1	0.003	<0.01	<0.1	72	11000		
TL-BKSB-143	55.6	1.21	F	<0.1	<0.1	3200	0.2	<0.1	910	7.4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	26	6500		
TL-BKSB-145	35.9	0.41	F	<0.5	<0.5	2800	<1	<0.5	880	12	<0.03	<3	<5	<0.01	<0.05	<0.5	30	6600		
TL-BKSB-146	53.5	1.17	F	<0.1	<0.1	3200	<0.2	<0.1	890	7.5	<0.006	<0.6	<1	<0.002	<0.01	<0.1	33	5800		
TL-BKSB-148	62.3	1.86	F	<0.1	<0.1	3500	0.2	<0.1	1000	5.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	31	5400		
TL-BKSB-150	53	1.17	F	<0.1	<0.1	3100	<0.2	<0.1	950	7.4	<0.006	<0.6	<1	<0.002	<0.01	<0.1	35	6500		
TL-BKSB-132	60.2	1.63	M	<0.1	<0.1	2700	<0.2	<0.1	1600	16	<0.006	<0.6	<1	<0.002	<0.01	<0.1	60	10000		
TL-BKSB-134	54.6	1.13	M	<0.1	<0.1	2500	0.2	<0.1	1400	23	<0.006	<0.6	<1	0.002	<0.01	<0.1	67	11000		
TL-BKSB-135	69.4	2.75	M	<0.1	<0.1	3000	<0.2	<0.1	1100	7.8	<0.006	<0.6	<1	<0.002	<0.01	<0.1	50	6900		
TL-BKSB-136	59	1.51	M	<0.1	<0.1	3200	<0.2	<0.1	1000	6.3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	33	5900		
TL-BKSB-137	56.7	1.25	M	<0.1	<0.1	2600	0.2	<0.1	1500	14	<0.006	<0.6	<1	0.003	<0.01	<0.1	65	10000		
TL-BKSB-138	58.7	1.69	M	<0.1	<0.1	3300	<0.2	<0.1	940	5.3	<0.006	<0.6	<1	<0.002	<0.01	<0.1	33	4900		
TL-BKSB-139	62.1	1.81	M	<0.1	<0.1	3200	<0.2	<0.1	1000	6	<0.006	<0.6	<1	<0.002	<0.01	<0.1	46	6300		
TL-BKSB-140	51.3	1.06	M	<0.1	<0.1	3300	<0.2	<0.1	1100	10	<0.006	<0.6	<1	<0.002	<0.01	<0.1	39	7100		
TL-BKSB-142	61.8	1.84	M	<0.1	<0.1	2800	<0.2	<0.1	1300	12	<0.006	<0.6	<1	<0.002	<0.01	<0.1	53	8500		
TL-BKSB-144	60	1.64	M	<0.1	<0.1	2500	<0.2	<0.1	1500	13	<0.006	<0.6	<1	<0.002	<0.01	<0.1	71	9100		
TL-BKSB-147	56.7	1.54	M	<0.1	<0.5	2700	<0.2	<0.1	1300	12	<0.006	<0.6	<1	0.015	<0.01	<0.1	63	10000		
TL-BKSB-149	65.3	2.18	M	<0.05	<0.05	3300	0.2	<0.05	1000	7.4	<0.003	<0.3	<0.5	<0.001	<0.005	<0.05	37	5800		

MWQSOG guideline