

CAMP Fish Mercury Sampling Protocol

Fish mercury monitoring is conducted at 27 of the CAMP waterbodies (Table 1). Samples are collected from fish captured during the conduct of the fish community monitoring program. Sampling is conducted every three years except at one on-system (Threepoint Lake) and one off-system (Leftrook Lake) lake that are monitored annually (Table 1).

Muscle samples from three large-bodied fish species (Lake Whitefish [*Coregonus clupeaformis*], Northern Pike [*Esox lucius*], and Walleye [*Sander vitreus*] and whole bodies of one small-bodied fish species (1-year-old [1+] Yellow Perch [*Perca flavescens*]) are analysed for mercury.

Large-Bodied Fish Sampling: Whitefish, Pike, and Walleye

A target number of 36 Lake Whitefish, 36 Northern Pike, and 36 Walleye are collected over a broad range of fish lengths at each waterbody when fish community monitoring is conducted. Fish are selected for mercury analysis across the range of size classes (50 mm intervals) of fish captured for each of the species, with equal representation of the size classes as feasible (i.e., length-stratified).

Large-bodied fish >150 mm (approximately) are measured for fork length (± 1 mm) and weighed (± 10 g) prior to taking a muscle sample for mercury analysis. An ageing structure (i.e., otoliths from Walleye and Lake Whitefish, and cleithra from Northern Pike) is collected in the field from all large-bodied fish sampled for mercury.

Muscle samples for mercury analysis are collected by cutting a thick “chunk” of tissue (approximately 20 g) with skin attached from the side of the fish near the dorsal fin. The muscle sample is wrapped in cling wrap, placed in a labeled Whirl-Pak bag, and placed on ice. Samples are frozen until submission to the analytical laboratory.

Small-Bodied Fish Sampling: 1-Year-Old Yellow Perch

A target number of 25, 1-year-old Yellow Perch between 70 and 100 mm in length (approximately) are collected from each waterbody (where present) when fish community monitoring is conducted. Yellow Perch sampled for mercury are measured for fork length (± 1 mm) and weighed (± 1 g). Whole fish are individually wrapped in cling wrap, placed in an individual Whirl-Pak bag, and placed on ice. Fish are then frozen until processed at the laboratory. At the laboratory, ageing structures (i.e., otoliths) are collected from each fish and a sample consisting of the body midsection from (but excluding) the pectoral girdle to the caudal peduncle is prepared for submission for mercury analysis.

Laboratory Methods

Samples are submitted to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory for mercury analysis. All analyses are conducted using standard methods and laboratory quality assurance/quality control (QA/QC) procedures.

Quality Assurance/Quality Control Samples

Two types of QA/QC samples are included in the fish mercury program: interlaboratory comparison samples; and duplicate samples.

- **Interlaboratory Comparison Samples** – Samples for interlaboratory comparison are collected from a sub-sample of fish. Two separate pieces of muscle from large-bodied fish are collected and submitted to two different CALA accredited analytical laboratories (the primary laboratory and a second laboratory). This type of QA/QC sample provides a measure of interlaboratory variability.
- **Duplicate Samples** – Duplicate samples are collected from a sub-sample of fish and submitted to the primary analytical laboratory for analysis. Duplicate samples provide a measure of variability of mercury within a fish, as well as variability associated with sampling and laboratory analysis.

Table 1. Frequency and locations of CAMP fish mercury monitoring.

Waterbody	On/Off-System	Sampling Frequency	First Sampled
Winnipeg River Region			
Pointe du Bois Forebay	On-System	3 Years	2010
Manigotagan Lake	Off-System	3 Years	2010
Saskatchewan River Region			
Cedar Lake - Southeast	On-System	3 Years	2010
Cormorant Lake	Off-System	3 Years	2010
Upper Churchill River Region			
Granville Lake	Off-System	3 Years	2010
Southern Indian Lake - Area 4	On-System	3 Years	2010
Southern Indian Lake - Area 6	On-System	3 Years	2010
Rat Lake	On-System	3 Years	2010
Lower Churchill River Region			
Northern Indian Lake	On-System	3 Years	2010
Lower Churchill River at the Little Churchill River	On-System	3 Years	2010
Lower Churchill River at the Churchill Weir	On-System	3 Years	2017
Gauer Lake	Off-System	3 Years	2010
Churchill River Diversion Region			
Threepoint Lake	On-System	Annually	2010
Wuskwatim Lake	On-System	3 Years	2021
Leftrook Lake	Off-System	Annually	2010
Upper Nelson River Region			
Lake Winnipeg - Mossy Bay	On-System	3 Years	2010
Playgreen Lake	On-System	3 Years	2010
Little Playgreen Lake	On-System	3 Years	2010
Cross Lake – West basin	On-System	3 Years	2010
Sipiwesk Lake	On-System	3 Years	2011
Setting Lake	Off-System	3 Years	2010
Lower Nelson River Region			
Split Lake	On-System	3 Years	2010
Stephens Lake - South	On-System	3 Years	2009
Limestone GS Forebay	On-System	3 Years	2010
Lower Nelson River downstream of the Limestone GS	On-System	3 Years	2010
Assean Lake	Off-System	3 Years	2010
Hayes River	Off-System	3 Years	2010