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**A Summary Report of
Mercury Contamination
in Fishes from Manitoba
Waters to March, 1971**

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ABSTRACT

Results of tests for total mercury residues in fishes from Manitoba waters between December 1969 and March 1, 1971 are presented in this report. Mercury contamination in fishes was examined from the viewpoint of being greater 0.50 ppm and more than 0.25 ppm. Fishes which contained more than 0.25 ppm mercury were considered to possess elevated levels of mercury, while those with more than 0.50 ppm were deemed contaminated.

The status of commercially fished lakes in Manitoba in 1970, with respect to their level of mercury contamination, is also briefly considered in this report.

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INTRODUCTION

Data presented in this report¹ represent results of mercury analyses of fish from Manitoba waters compiled by the Freshwater Institute (FWI), Fisheries Research Board of Canada, the Fish Inspection Laboratory (FIL), Canada Department of Fisheries and Forestry and the Environmental Health Laboratory (EHL), Manitoba Department of Health and Social Development to the present date (March 1, 1971).

Most data for fish from various waters have been grouped into major drainage or river systems. The major river systems considered herein are the Saskatchewan, Churchill, Nelson, Hayes, Winnipeg, Red and Assiniboine Rivers. Data for Lake Winnipeg fish have also been treated separately. Waters sampled along the above river systems and the areas of Lake Winnipeg are arranged in upstream to downstream order in the appended tables. Tributary waters closely associated with the mainstream of the above rivers have been indicated by the notation (T). A number of other waters, although they may be connected with one of the above drainages, have been grouped here as miscellaneous waters in order to simplify this presentation.

In all cases, the data given here are for mercury levels in axial muscle only and are on a wet-weight basis. Mercury levels are given for samples of fish where a sample may consist of from one to

¹This report was initially prepared for internal information only on March 15, 1971.

twenty individual fish of a species captured from a given area on a given date.

In examining the levels of mercury contamination in a given water, consideration has been given to the percentage of fish samples containing 0.5 ppm or more and 0.25 ppm or more mercury. The 0.5 ppm level is the current health standard employed by the Federal Food and Drug Directorate for mercury in fish. Fish with more than 0.5 ppm mercury cannot be sold or marketed. The percentage of samples exceeding 0.25 ppm are examined here in order to determine if abnormal mercury levels exist in a given water body. Special consideration in this respect is given to predatory species such as pike, walleye which are at the top of the aquatic food chain and which are most susceptible to the accumulation of mercury. Swedish investigators (Johnels *et al.*, 1967) have shown that in water where unusual amounts of mercury occur, the mercury level in pike muscle increases with the age (or weight) of the fish. Where mercury levels in water are low, mercury levels in pike muscle are less than 0.2 ppm and do not increase with increasing fish size. It was concluded from this that fish are not able to eliminate mercury rapidly enough to prevent accumulation when the concentration in muscle tissues exceeded 0.2 ppm (Lofroth, 1970). In the following discussion of results, the term elevated mercury levels will refer to those samples containing 0.25 ppm or more mercury while contaminated samples are those containing 0.5 ppm mercury or more.

RESULTS AND DISCUSSION

Lake Winnipeg

A total of 10 different fish species from Lake Winnipeg have been tested for mercury. To date, elevated mercury levels have been observed in all species with the exception of whitefish and ciscoes (Table 1). Elevated levels were observed for fish from all areas suggesting the presence of mercury throughout the lake. Although mercury may be present in all parts of Lake Winnipeg, parts of the lake have been more severely affected. Fish from the southern basin of Lake Winnipeg contained more mercury than fish from the north basin. Fifty-eight percent of the fish samples from the southern basin contained 0.5 ppm mercury or more. In the north basin, only 28 percent of the samples were found to be contaminated.

As has been reported previously (Derksen, 1978b) yellow perch currently continue to show the greatest degree of contamination of all fish species tested from Lake Winnipeg. The species in which the next highest contamination rates were observed were freshwater drum (sheepshead), sauger and northern pike, in that order. Contamination rates in carp and walleye remain low.

The Saskatchewan River Drainage

Results of mercury analyses on fish samples from the Saskatchewan River system in Manitoba are presented in Table 2. As indicated by these results, all waters directly on the flow-path of the Saskatchewan River produced fish with mercury levels above 0.5 ppm.

Species found to be most highly contaminated were sauger, walleye and pike. Goldeye from the river may also be contaminated. One sample of goldeye caught below The Pas contained 0.56 ppm mercury. Although sturgeon in the Saskatchewan River were not found to be contaminated, one sample exhibited an elevated mercury level (0.37 ppm). Both whitefish and ciscoes, as indicated by samples of these fish from Cedar Lake, appeared to be free of mercury.

One contaminated sample of pike was taken from the Carrot River, a tributary to the Saskatchewan River upstream from The Pas. Samples of walleye and goldeye from this tributary also showed elevated mercury levels. It is doubtful that these results indicate the presence of mercury pollutants in the Carrot River. These fish were caught approximately 12 miles from the river mouth and probably originated from the Saskatchewan River. Fish from two other water bodies, Rocky Lake and Lake Athapapuskow, which are tributaries of the Saskatchewan River, did not show any unusual accumulation of mercury.

Pike and walleye from the Summerberry River, which branches off from the Saskatchewan River below The Pas, were found to be contaminated. All fish sampled from Moose Lake, which drains into the Summerberry River, did not contain more than 0.25 ppm mercury. Cormorant Lake which flows via a small stream into the northern end of Moose Lake, however, contained pike, walleye and whitefish with elevated mercury concentrations. The source of mercury in Cormorant Lake is not known but may be natural since the lake receives no known waste effluents.

The Churchill River Drainage

Fish from 19 lakes on the Churchill River system and from the Churchill River near Hudson Bay were tested for mercury. Except for fish from one lake, fish samples from all parts of the Churchill River system contained less than 0.5 ppm mercury (Table 3). Walleye from McGavock Lake, south of the community of Lynn Lake, contained 0.53 ppm mercury. Concentrations approaching 0.5 ppm were also observed in northern pike from McGavock Lake. Elevated mercury levels were noted in most fish sampled from nine other lakes. These lakes were Reindeer, Kiskeynew, Granville, Vandekerckhove, Goldsand, Wells, Barrington, Northern Indian and Gauer lakes. Fish in the Churchill River between Northern Indian Lake and Hudson Bay, as suggested by the results of tests on fish from the area, appear to be free of mercury.

The fish species which most frequently exhibited elevated mercury levels were pike and walleye. Concentrations above 0.25 ppm were noted in some samples of lake trout and whitefish from Reindeer Lake in Manitoba. In general, however, lake trout, whitefish, ciscoes, goldeye and suckers from the Churchill River system did not possess more than 0.25 ppm mercury.

The Nelson River Drainage

Mercury levels observed in fish sampled from the Nelson River system present perhaps the most perplexing situation of the mercury problem in Manitoba. The Nelson River is connected to Lake Winnipeg which receives mercury-bearing influents from at least two known pollution

sources. This relationship has possibly, to some degree, contributed to the mercury levels in fish from the mainstream of the Nelson River. However, as will be elucidated below, fish samples from a number of lakes off the mainstream have been found to contain abnormal amounts of mercury.

During 1970, fish from at least twenty-one areas on the Nelson River system were tested for mercury. These areas included waters along and connected with the Nelson River proper and two of its larger tributary rivers, the Grass and Burntwood Rivers. Results of mercury analyses are presented in Table 4.

Although contaminated samples of pike and walleye were observed from northern Lake Winnipeg, not one fish sample from Playgreen Lake was found to be contaminated. Most of the pike and walleye tested from Playgreen Lake did, however, exhibit elevated mercury levels. Two of the six samples of yellow perch, and one out of seven samples of sturgeon also registered levels above 0.25 ppm.

One sample of walleye containing 0.61 ppm and one sample of pike with 0.51 ppm mercury were taken from Little Playgreen and Pipestone lakes, respectively. Elevated levels were also noted in walleye from Pipestone Lake. Although both these lakes receive water from Lake Winnipeg, most of the flow passes through Playgreen Lake and into the southwest end of Cross Lake. Before the Nelson River enters Cross Lake, it receives waters from Kiskittogisu and Kiskitto lakes. Some contaminated samples of pike and walleye were taken from Kiskittogisu Lake. In Kiskitto Lake, three out of four pike samples had more than 0.5 ppm mercury and walleye exhibited elevated mercury concentrations.

It is difficult to explain the presence of contaminated fish in Kiskittogisu and Kiskitto lakes when it is considered that neither receives any water originating from Lake Winnipeg and that one of the samples from Playgreen Lake proved to be contaminated. In view of the apparent absence of contaminated fish in Playgreen Lake, it is similarly difficult to account for the occurrence of contaminated fish in Little Playgreen and Pipestone lakes even though they do receive water from Lake Winnipeg. From the available data, it would appear that mercury levels in fish from the area in general are related more to sources of mercury other than that carried in by waters from Lake Winnipeg.

Contamination levels of mercury were again noted in samples of pike from Cross Lake and in pike and walleye from Duck Lake. Both lakes are on the mainstream of the Nelson River. Although mercury levels in the fish in these two lakes would undoubtedly be affected by mercury carried in from Lake Winnipeg, other sources of mercury may prevail in the area. It should be noted that contaminated samples of pike and walleye were captured from Drunken Lake. This lake, situated on the Minago River which is a tributary to Cross Lake, is well removed from the mainstream of the Nelson River.

Northern pike and walleye from Sipiwesk Lake exhibited the highest mercury concentrations of any fish sampled from the Nelson River system. Concentrations as high as 1.71 ppm in pike and 1.11 ppm in walleye were noted. Since the average level of mercury in pike and walleye were noted. Since the average level of mercury in pike and walleye in Sipiwesk Lake (about 0.85 ppm) was higher than in Lake Winnipeg, it is evident that the contamination of fish in Sipiwesk

Lake cannot be totally attributed to the effect of Lake Winnipeg waters. Relatively high levels of contamination were also observed in pike and walleye further downstream in Split Lake. Although mercury levels in Split Lake are possibly related to mercury in waters received from Sipiwesk Lake, other sources of mercury may exist. This view is supported by the observation that one sample of pike from Cauchon Lake contained 0.60 ppm mercury. Cauchon Lake is tributary to the Nelson River and situated approximately mid-way between Sipiwesk and Split lakes.

Fish from seven lakes associated with the Grass River were tested. None of these samples exhibited mercury concentrations in excess of 0.5 ppm. Elevated levels were only noted in fish from four lakes; Pakwa, Wintering, Partridge Crop and Pikwitonei lakes. Highest concentrations occurred in walleye and pike but one sample of whitefish from Pikwitonei Lake contained 0.25 ppm mercury. An elevated level was also noted in walleye sampled from one lake, Wuskwatim Lake, on the Burntwood River.

It is apparent from the above that mercury in the waters from Lake Winnipeg cannot be the entire cause of mercury contamination in the Nelson River system. If Lake Winnipeg waters were the sole source, the dilution of these waters would result in a progressive amelioration in the contamination of fish downstream along the Nelson River. As indicated by the presence of fish with elevated mercury levels in waters tributary to the Nelson River, much of the mercury in the Nelson may be derived from natural sources. It is, however, of particular interest that those lakes on the Nelson River from which contaminated samples

were taken are south and east-southeast of the mining community of Thompson. The prevailing winds in northern Manitoba blow from the west-northwest. The mercury contamination of waters on the Nelson River system may in part have resulted from the fallout of airborne mercury released by the smelting of nickel ores at Thompson. The atmospheric emission of sulphides from the smelter may also cause an increase in the acidity of precipitation which would enhance the leaching of natural occurring mercury into surface waters. Geological deposits around the Nelson River lakes may also contain relatively high mercury levels which could contribute to the natural contamination of water and fish.

The Hayes River Drainage

Fish samples from sixteen lakes on the Hayes River system were tested for mercury. These lakes were part of either the Gods, Hayes, Stupart or Bigstone rivers, the major rivers in the Hayes River basin. Contaminated fish samples were noted from only two lakes. Samples of pike from Washahigan Lake and Bigstone Lake contained 0.6 and 0.5 ppm mercury, respectively. Elevated mercury levels were observed in samples of various fish species from ten other lakes in the Hayes River system. Elevated concentrations occurred in 40 percent or more of the pike, lake trout and walleye sampled. Mercury levels in fish from the Hayes River system as a whole, however, were generally quite low (\ll 0.30 ppm).

The Winnipeg River and Tributaries

No fish samples from the Winnipeg River in Manitoba were

tested during 1970 in addition to those previously reported by Derksen (1978b). Mercury levels in fish samples from the Winnipeg River are listed in Table 6. All species with the exception of mooneye, whitefish and burbot were found to be contaminated. The three aforementioned species from the Winnipeg River did, however, contain elevated mercury levels.

With respect to tributaries of the Winnipeg River, contaminated samples of fish were taken from only two areas, the Bird River and Caddy Lake (Table 7). The contaminated saugers captured from the Bird River may have moved there from the mercury polluted waters of Lac du Bonnet. The presence of contaminated walleye in Caddy Lake is more difficult to explain since this lake is well removed from the Winnipeg River. It is doubtful that walleyes from the mercury polluted Winnipeg River could have migrated into Caddy Lake. Elevated levels were found in fish from nearby Brereton Lake. This would indicate that the apparent contamination of walleyes in Caddy Lake may have been caused by natural sources of mercury.

The Red River Drainage

During 1970, fish from five locations on the Red River in Manitoba and two lakes on the Pembina River, a tributary of the Red River, were tested for mercury. Results of the analyses are given in Table 8. The highest mercury concentration (1.11 ppm) in fish in the Manitoba portion of the Red River was noted in a sample of pike from Emerson. There appeared to be a progressive decline in the mercury contamination of pike downstream. The average mercury concentrations

in pike samples from St. Norbert, Lockport, Selkirk and Netley Creek were 0.86, 0.68, 0.64 and 0.74 ppm, respectively. Some samples of walleye and sauger were contaminated, but mercury levels in these species were generally lower than in pike. Elevated levels were observed in freshwater drum, suckers and carp from various areas along the Red River in Manitoba.

It is of particular interest to note that mercury levels in fish from the Red River upstream from Winnipeg were higher than in samples caught below Winnipeg. Mercury concentration recorded in fish samples captured near Halstead, Minnesota suggest that much of the mercury in the Red River originates from sources outside Manitoba. At Halstead, a concentration of 1.57 ppm was recorded in a pike sample, while samples of catostomid fishes contained as much as 0.71 ppm mercury.

Samples of pike and yellow perch from Pelican and Rock Lakes were tested for mercury. One sample of pike from Rock Lake contained 1.82 ppm mercury. Subsequent retesting of pike from Rock Lake revealed only 0.19 ppm. Mercury concentrations well below 0.25 ppm were observed in yellow perch from both Pelican Lake and Rock Lake and in pike from Pelican Lake. On the basis of these results it is doubtful that significant amounts of mercury exist in the Pembina River.

The Assiniboine River Drainage

During 1970, mercury analyses were performed on fish samples captured from various locations along the Assiniboine River and two of its tributaries, the Souris and Minnedosa Rivers. The results of

analyses on fish samples from the Assiniboine River (Table 9) indicated the presence of abnormal amounts of mercury in the river. Although pike contained less than 0.5 ppm mercury, most samples of walleye and saugers were contaminated. The highest concentration of mercury in any fish sample from the Assiniboine River was recorded for a sample of sauger from the Portage la Prairie area. Although pike were not contaminated, all samples did exhibit elevated mercury levels. Suckers captured upstream from Brandon appeared to be free of mercury, but below Brandon suckers did possess elevated levels and one sample was found to be contaminated.

In the Souris River, elevated levels were observed in all samples of pike (Table 10). One sample of walleye from above the Wawanesa dam was contaminated. Although pike in Oak Lake possessed less than 0.25 ppm mercury, a walleye sample from this lake showed elevated mercury concentrations.

Fish samples from the Minnedosa River were captured in Clear Lake at the headwaters of the river, in the Minnedosa reservoir and in the Rivers reservoir near the mouth of the river. A total of twenty samples were captured from the above areas and only three of the samples were found to be contaminated (Table 11). Two of the contaminated samples were from Clear Lake; one consisted of pike which were found dead on the beach and the second of lake trout netted from the north end of the lake. The third contaminated sample was that of yellow perch from the Rivers reservoir. Elevated levels were also noted in samples of walleye and whitefish captured near the east end of Clear Lake.

Miscellaneous Manitoba Waters

The mercury concentrations in fish from twenty-three miscellaneous waters in Manitoba are given in Table 12. Contaminated samples of fish were captured in seven of these waters while elevated levels were found in fish from eight additional waters. Although one contaminated sample of pike was found in Lake Manitoba and three samples of fish from Lake Winnipegosis exhibited elevated mercury, the majority of fish samples from both lakes possessed less than 0.25 ppm mercury. This indicates that both these large lakes are virtually free of mercury contaminants. The other waters from which contaminated samples were taken include Whitefish Lake (101° 36', 52° 20'), Falcon Lake, Aikens Lake, Sasaginnigak Lake, Fishing Lake and Harrop Lake. Except Whitefish Lake, all these lakes are situated on the Precambrian Shield. Although most of these Precambrian lakes have only been sampled once, there seems little doubt that they are contaminated. Studies of Falcon Lake (Derksen, 1978a) suggest two possible sources of mercury contamination in this lake. The mercury in Falcon Lake may have originated from the use of mercurial fungicides on an adjacent golf course and/or from surrounding mineral deposits. The possibility that the mercury contamination of Falcon Lake may be due to natural sources is given credence by the observation of contaminated walleyes in nearby Caddy Lake (Table 7). The sources of mercury in the other more remote Precambrian lakes are unknown, but may originate from mineral deposits with high mercury content. The presence of elevated mercury concentrations in samples of pike and/or walleye from such waters as Long, Wanipigow, Family and Dogskin lakes may also be

due to natural causes. These lakes are located on the Precambrian Shield and in the same general area as the above mentioned contaminated lakes.

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ADDENDUM

Because of the presence of high mercury levels in commercial fish species, a number of areas in Manitoba have been closed to commercial fishing. These areas include: Lake Winnipeg, Cedar Lake, the Saskatchewan River, Sipiwesk Lake, Split Lake and the lower portions of the Winnipeg and Red Rivers.

To assure the quality, with respect to mercury, of all fish commercially produced in Manitoba, the Fish Inspection Branch of the Canada Department of Fisheries and Forestry inspects fish from all waters with existing commercial fisheries. In order to facilitate this inspection, the Fish Inspection Laboratory has placed waters from which fish have already been tested into three categories. These categories are (1) clean areas or waters in which all or most fish species contain less than 0.25 ppm, (2) caution areas or waters where most species contain more than 0.25 ppm and (3) detention areas or waters in which some species contain more than 0.5 ppm mercury (all predatory species from these waters are detained). According to the Fish Inspection Laboratory in Winnipeg, the breakdown of Manitoba waters into these categories is as follows.

ALL SPECIES BELOW 0.25 PPM

<u>Lake</u>	<u>Latitude</u>	<u>Longitude</u>
Atkinson	55 ^o 59'	94 ^o 48'
Baldock	56 ^o 33'	97 ^o 57'
Barrier	55 ^o 20'	101 ^o 55'
Barrington	56 ^o 55'	100 ^o 15'
Billard	57 ^o 09'	96 ^o 08'
Brochet	58 ^o 36'	101 ^o 35'
Buckland	57 ^o 39'	96 ^o 47'
Camping	55 ^o 04'	96 ^o 49'
Chicken	56 ^o 31'	100 ^o 41'
Colen	54 ^o 33'	95 ^o 25'
Cranberry	54 ^o 35'	101 ^o 28'
Dafoe	55 ^o 44'	96 ^o 15'
Dauphin	51 ^o 17'	99 ^o 48'
Dunphy	56 ^o 41'	101 ^o 34'
Gauer	57 ^o 00'	97 ^o 50'
Goldsand	57 ^o 02'	101 ^o 08'
Goose	54 ^o 14'	94 ^o 33'
Halfway	55 ^o 03'	98 ^o 24'
Herb	54 ^o 45'	99 ^o 50'
High Hill	55 ^o 34'	95 ^o 42'
Horseshoe Bay (Lake of the Woods)		
Island Lake	53 ^o 49'	94 ^o 25'
Kipahigan	55 ^o 20'	101 ^o 55'
Kisseynew	54 ^o 58'	101 ^o 35'
Kistigan	54 ^o 37'	92 ^o 35'
Knee	55 ^o 03'	94 ^o 45'
Limestone	56 ^o 35'	95 ^o 55'
Little Herb	54 ^o 56'	99 ^o 54'
Manitoba	51 ^o 00'	98 ^o 45'
Molson	54 ^o 12'	96 ^o 45'
Moose	53 ^o 46'	100 ^o 08'
North Indian	57 ^o 20'	97 ^o 20'

ALL SPECIES BELOW 0.25 PPM

<u>Lake</u>	<u>Latitude</u>	<u>Longitude</u>
Opachuanau	56 ^o 44'	99 ^o 37'
Pikwitonei	55 ^o 33'	97 ^o 03'
Russell	56 ^o 15'	101 ^o 30'
Silsby	55 ^o 29'	95 ^o 46'
South Indian	57 ^o 10'	98 ^o 30'
Stevenson	53 ^o 55'	96 ^o 09'
Stull	54 ^o 23'	92 ^o 34'
Stupart	55 ^o 37'	94 ^o 08'
Suwannee	56 ^o 08'	100 ^o 10'
Walker	54 ^o 42'	96 ^o 57'
Waskaiowaka	56 ^o 33'	96 ^o 23'
Whitefish	55 ^o 34'	93 ^o 15'
William	53 ^o 54'	99 ^o 21'
Winnipegosis	52 ^o 30'	100 ^o 00'
Wintering	55 ^o 23'	97 ^o 23'
Witchai	56 ^o 00'	96 ^o 50'
Wuskwatim	55 ^o 32'	98 ^o 32'

CAUTION AREA

Most species over 0.25 ppm

<u>Lake</u>	<u>Latitude</u>	<u>Longitude</u>
Granville	56 ^o 18'	100 ^o 30'
Pakwa	54 ^o 51'	98 ^o 53'
Partridge Crop	55 ^o 38'	97 ^o 27'
Playgreen	54 ^o 00'	98 ^o 15'
Sellers	55 ^o 00'	94 ^o 30'
Setting	55 ^o 00'	98 ^o 38'
St. Martin	51 ^o 37'	98 ^o 29'
Utik	55 ^o 16'	96 ^o 00'
Wood	57 ^o 28'	97 ^o 45'

DETENTION AREA

Some species exceeding 0.5 ppm

All predatory species being detained

<u>Lake</u>	<u>Latitude</u>	<u>Longitude</u>
Cauchon	55 ^o 30'	96 ^o 27'
Cormorant	54 ^o 15'	100 ^o 50'
Cross	54 ^o 45'	97 ^o 30'
Duck	54 ^o 52'	98 ^o 11'
Drunken	54 ^o 31'	98 ^o 27'
Election	54 ^o 35'	101 ^o 13'
Kiskitto Lake	54 ^o 16'	98 ^o 30'
Kiskittogisu	54 ^o 13'	98 ^o 20'
Pipestone	54 ^o 31'	97 ^o 38'
Prud'homme	55 ^o 26'	96 ^o 42'
Summerberry (River)	53 ^o 23'	100 ^o 22'
Talbot	54 ^o 00'	99 ^o 55'
White Rabbit	54 ^o 59'	97 ^o 20'

TABLE 1. Mercury levels in fish from various areas of Lake Winnipeg.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
Red River	N. pike	1	--	0.26	--	--	100	FWI
	Walleye	1	--	0.50	--	100	100	FWI
	Sauger	1	--	0.59	--	100	100	FWI
Victoria Beach	N. pike	5	0.43	0.52	0.66	40	100	FWI
	Walleye	7	0.28	0.38	0.53	29	100	FWI
	Sauger	11	0.39	0.59	0.99	82	100	FWI
	Yellow perch	8	0.35	0.60	0.79	88	100	FWI
	FW drum	1	--	0.56	--	100	100	FWI
	Whitefish	1	--	0.11	--	--	--	FWI
	Carp	4	0.23	0.35	0.42	--	75	FWI
Traverse Bay	Burbot	1	--	0.22	--	--	--	FWI
	Sucker sp.	1	--	0.32	--	--	100	FWI
Gimli	N. pike	4	0.32	0.45	0.66	25	100	FWI
	Walleye	9	0.27	0.43	0.57	33	100	FWI
	Sauger	8	0.50	0.58	0.71	100	100	FWI
	Yellow perch	8	0.17	0.68	0.92	88	88	FWI
	FW drum	3	0.18	0.59	1.03	67	67	FWI
	Whitefish	2	0.07	0.14	0.20	--	--	FWI
	Carp	4	0.27	0.41	0.51	50	100	FWI
Riverton	N. pike	1	--	0.57	--	100	100	FWI
	Walleye	2	0.21	0.24	0.28	--	50	FWI
	Sauger	3	0.26	0.37	0.57	33	100	FWI
	Yellow perch	2	0.76	0.88	0.99	100	100	FWI
	FW drum	2	0.43	0.60	0.76	50	100	FWI
	Whitefish	1	--	<0.18	--	--	--	EHL
Hecla Island	N. pike	6	0.35	0.60	0.80	67	100	FWI
	Walleye	6	0.16	0.39	0.76	17	83	FWI
	Sauger	9	0.29	0.63	0.93	89	100	FWI
	Yellow perch	9	0.49	0.67	0.93	89	100	FWI
	FW drum	6	0.20	0.60	0.89	67	83	FWI
Washow Bay	Walleye	1	--	0.28	--	--	100	FWI
	Sauger	4	0.35	0.46	0.60	25	100	FWI
	Yellow perch	1	--	0.68	--	100	100	FWI
Pine Dock	FW drum	1	--	0.26	--	--	100	FWI
Calder Dock	Walleye	1	--	0.57	--	100	100	FWI
	Sauger	1	--	0.53	--	100	100	FWI

TABLE 1. Cont'd.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
Black Bear Is.	N. pike	2	0.39	0.44	0.50	50	100	FWI
	Walleye	3	0.13	0.26	0.41	--	67	FWI
	Sauger	4	0.54	0.60	0.70	100	100	FWI
	Yellow perch	2	0.44	0.48	0.52	50	100	FWI
Tamarack Is.	Sauger	1	--	0.33	--	--	100	FWI
Sturgeon Bay	N. pike	1	--	0.34	--	--	100	FWI
	Walleye	1	--	0.37	--	--	100	FWI
Berens River	Walleye	1	--	0.28	--	--	100	FWI
	Sauger	2	0.23	0.34	0.44	--	50	FWI
Poplar River	N. pike	1	--	0.70	--	100	100	FWI
	Walleye	3	0.26	0.37	0.49	--	100	FWI
	Sauger	1	--	0.37	--	--	100	FWI
	Whitefish	1	--	0.03	--	--	--	FWI
	Cisco sp.	1	--	0.12	--	--	--	FWI
Long Point	N. pike	1	--	0.58	--	100	100	FWI
	Walleye	1	--	0.33	--	--	100	FWI
	Sauger	3	0.40	0.45	0.54	33	100	FWI
	Whitefish	1	--	0.03	--	--	--	FWI
Grand Rapids	N. pike	5	0.29	0.57	1.27	40	100	FWI
	Walleye	3	0.26	0.33	0.40	--	100	FWI
	Sauger	1	--	0.43	--	--	100	FWI
	Whitefish	1	--	0.03	--	--	--	FWI
Lake Winnipeg (undesignated)	N. pike	5	0.23	0.46	0.77	40	80	FWI
	Walleye	8	0.18	0.35	0.62	12	75	FWI
	Sauger	2	0.41	0.44	0.46	--	100	FWI
	Yellow perch	2	0.48	0.58	0.69	50	100	FWI
	Sucker sp.	3	0.11	0.18	0.30	--	33	FWI
	Burbot	3	0.09	0.18	0.26	--	33	FWI
	FW drum	12	0.27	0.82	3.59	83	100	FWI
	Whitefish	7	0.01	0.06	0.15	--	--	FWI
Cisco sp.	2	0.05	0.06	0.07	--	--	FWI	

TABLE 2. Mercury levels in fish from the Saskatchewan River drainage system in Manitoba. Tributary waters indicated by (T).

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
SASKATCHEWAN RIVER								
L. Athapapuskow (T) 54° 33' 101° 40'	N. pike	1	--	0.23	--	--	--	FWI
	Walleye	1	--	0.04	--	--	--	FWI
	Yellow perch	1	--	0.01	--	--	--	FWI
	Lake trout	1	--	0.08	--	--	--	FWI
Rocky Lake (T) 54° 06' 101° 53'	N. pike	1	--	0.18	--	--	--	FWI
	Walleye	1	--	0.16	--	--	--	FWI
Carrot River (T)	N. pike	1	--	1.36	--	100	100	FWI
	Walleye	1	--	0.34	--	--	100	FWI
	Goldeye	1	--	0.30	--	--	100	FWI
Saskatchewan R. Below The Pas	N. pike	1	--	0.69	--	100	100	FWI
	Walleye	1	--	0.75	--	100	100	FWI
	Goldeye	1	--	0.56	--	100	100	FWI
	Sturgeon	2	0.21	0.29	0.37	--	50	FWI
Cedar Lake 53° 20' 100° 10'	N. pike	22	0.23	0.56	0.89	55	95	FWI
	Walleye	15	0.38	0.52	0.78	47	100	FWI
	Sauger	5	0.36	0.61	0.75	80	100	FWI
	Whitefish	9	<0.03	0.09	0.22	--	--	FWI
	Cisco sp.	7	0.02	0.11	0.30	--	14	FWI
Cross Lake 53° 15' 99° 30'	N. pike	1	--	1.15	--	100	100	FWI
Grand Rapids 53° 10' 99° 18'	N. pike	1	--	0.30	--	--	100	FWI
	Walleye	1	--	0.26	--	--	100	FWI
Saskatchewan River (undesignated)	N. pike	2	0.39	0.85	1.31	50	100	FWI
	Walleye	2	0.34	0.42	0.49	--	100	FWI

TABLE 2. Cont'd.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
SUMMERBERRY RIVER								
Cormorant Lake (T)								
54° 15' 100° 50'	N. pike	1	--	0.25	--	--	100	FWI
	Walleye	1	--	0.32	--	--	100	FWI
	Walleye	1	--	0.59	--	100	100	FIL
	Whitefish	1	--	0.30	--	--	100	FIL
	Sucker sp.	1	--	0.08	--	--	--	FWI
Moose Lake (T)								
53° 20' 100° 10'	N. pike	2	0.11	0.15	0.19	--	--	FWI
	N. pike	2	0.22	0.22	0.23	--	--	FIL
	Walleye	2	0.08	0.10	0.11	--	--	FWI
	Walleye	2	0.15	0.15	0.15	--	--	FIL
	Whitefish	3	0.01	0.05	0.08	--	--	FWI
	Whitefish	1	--	0.05	--	--	--	FIL
	Cisco sp.	2	0.04	0.04	0.04	--	--	FWI
	Goldeye	1	--	0.18	--	--	--	FIL
Summerberry River								
	N. pike	1	--	0.79	--	100	100	FWI
	N. pike	5	0.59	0.76	0.92	100	100	FIL
	Walleye	1	--	0.71	--	100	100	FWI
	Walleye	4	0.58	0.67	0.85	100	100	FIL

TABLE 3. Mercury levels in fish from the Churchill River drainage system in Manitoba. (T) denotes tributaries to the main-stream of the Churchill River.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
Reindeer Lake 57° 20' 102° 00'	Walleye	1	--	0.49	--	--	100	FIL
	Lake trout	3	0.24	0.33	0.40	--	67	FIL
	Whitefish	2	0.18	0.26	0.33	--	50	FIL
Sisipuk Lake 55° 45' 101° 50'	Walleye	1	--	0.12	--	--	--	FIL
	Whitefish	1	--	0.05	--	--	--	FIL
Kisseynew Lake (T) 54° 58' 101° 35'	N. pike	1	--	0.33	--	--	100	FIL
	Walleye	1	--	0.29	--	--	100	FIL
	Whitefish	1	--	0.04	--	--	--	FIL
Kississing Lake (T) 55° 10' 101° 20'	N. pike	1	--	0.13	--	--	--	FIL
	Walleye	2	0.15	0.15	0.15	--	--	FIL
	Whitefish	1	--	0.02	--	--	--	FIL
Granville Lake 56° 18' 100° 30'	N. pike	2	0.33	0.40	0.48	--	100	FWI
	Walleye	2	0.16	0.22	0.27	--	50	FWI
	Walleye	1	--	0.39	--	--	100	FIL
	Whitefish	1	--	0.07	--	--	--	FIL
Vandekerckhove L. (T) 57° 02' 101° 25'	N. pike	1	--	0.30	--	--	100	FWI
	Walleye	1	--	0.44	--	--	100	FWI
Goldsand Lake (T) 57° 02' 101° 08'	N. pike	1	--	0.26	--	--	100	FIL
	Walleye	1	--	0.21	--	--	--	FWI
	Walleye	2	0.21	0.28	0.36	--	50	FIL
	Whitefish	1	--	0.11	--	--	--	FIL
Chicken Lake (T) 56° 31' 100° 41'	Whitefish	1	--	0.06	--	--	--	FIL
Dunphy Lake (T) 56° 41' 101° 34'	N. pike	1	--	0.14	--	--	--	FIL
	Whitefish	1	--	0.02	--	--	--	FIL

TABLE 3. Cont'd.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
McGavock Lake (T)								
56° 32' 101° 25'	N. pike	1	--	0.46	--	--	100	FWI
	Walleye	1	--	0.53	--	100	100	FWI
Opachuanau Lake								
56° 44' 99° 37'	Walleye	1	--	0.20	--	--	--	FIL
	Whitefish	1	--	0.06	--	--	--	FIL
Wells Lake (T)								
57° 15' 101° 00'	N. pike	1	--	0.45	--	--	100	FIL
	Walleye	1	--	0.45	--	--	100	FIL
	Whitefish	1	--	0.11	--	--	--	FIL
Barrington Lake (T)								
56° 55' 100° 15'	N. pike	1	--	0.36	--	--	100	FIL
	Walleye	1	--	0.25	--	--	100	FIL
	Whitefish	1	--	0.07	--	--	--	FIL
S. Indian Lake								
57° 10' 98° 30'	N. pike	1	--	0.31	--	--	100	FWI
	Walleye	1	--	0.21	--	--	--	FWI
	Walleye	1	--	0.24	--	--	--	FIL
	Whitefish	1	--	0.05	--	--	--	FWI
	Whitefish	1	--	0.08	--	--	--	FIL
N. Indian Lake								
57° 20' 97° 20'	Walleye	2	0.28	0.36	0.43	--	100	FIL
	Whitefish	1	--	0.16	--	--	--	FIL
Baldock Lake (T)								
56° 33' 97° 57'	Walleye	1	--	0.27	--	--	100	FIL
	Lake trout	1	--	0.24	--	--	--	FIL
	Whitefish	1	--	0.12	--	--	--	FIL
Gauer Lake (T)								
57° 00' 97° 50'	N. pike	1	--	0.31	--	--	100	FIL
	Walleye	1	--	0.25	--	--	100	FIL
	Whitefish	1	--	0.13	--	--	--	FIL
Billard Lake								
57° 09' 96° 08'	Walleye	1	--	0.33	--	--	100	FIL
	Whitefish	1	--	0.08	--	--	--	FIL
Buckland Lake (T)								
57° 09' 96° 47'	Lake trout	1	--	0.20	--	--	--	FIL
	Whitefish	1	--	0.07	--	--	--	FIL

TABLE 3. Cont'd.

Location	Species	No. of Samples	Hg - ppm			% ≥0.5	% ≥0.25	Agency
			Min.	Mean	Max.			
Churchill River (near Hudson Bay)	N. pike	1	--	0.24	--	--	--	FWI
	Whitefish	1	--	0.12	--	--	--	FWI
	Cisco sp.	1	--	0.12	--	--	--	FWI
	Capelin	1	--	0.04	--	--	--	FWI
Churchill River (near Hudson Bay)	Sturgeon sucker	1	--	0.13	--	--	--	FWI
	Sucker sp.	1	--	0.22	--	--	--	FWI
Churchill River (undesignated)	Walleye	1	--	0.24	--	--	--	FIL
	Goldeye	1	--	0.08	--	--	--	FIL
	Whitefish	1	--	0.04	--	--	--	FIL

TABLE 4. Mercury levels in fish from the Nelson River system in Manitoba. Tributaries to the Nelson River and to two other major rivers in the drainage system, the Grass and Burntwood Rivers, are indicated by the notation (T).

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
NELSON RIVER								
Playgreen Lake								
54° 00' 98° 15'	N. pike	2	0.28	0.28	0.29	--	100	FWI
	N. pike	11	0.23	0.36	0.47	--	91	FIL
	Walleye	2	0.26	0.31	0.36	--	100	FWI
	Walleye	7	0.16	0.26	0.39	--	43	FIL
	Yellow perch	6	0.12	0.23	0.45	--	33	FIL
	Whitefish	4	0.10	0.12	0.14	--	--	FIL
	Cisco sp.	2	0.05	0.06	0.06	--	--	FWI
	Cisco sp.	1	--	0.11	--	--	--	FIL
	Sturgeon	7	0.07	0.18	0.49	--	14	FIL
Little Playgreen Lake								
54° 00' 97° 55'	N. pike	1	--	0.08	--	--	--	FWI
	Walleye	1	--	0.61	--	100	100	FWI
Pipestone Lake								
54° 31' 97° 38'	N. pike	1	--	0.51	--	100	100	FWI
	Walleye	1	--	0.41	--	--	100	FWI
	Walleye	1	--	0.28	--	--	100	FIL
	Whitefish	1	--	0.05	--	--	--	FIL
Kiskittogisu Lake (T)								
54° 13' 98° 30'	N. pike	18	0.24	0.40	0.56	11	94	FIL
	Walleye	21	0.19	0.36	0.68	5	?	FIL
	Whitefish	3	0.04	0.07	0.09	--	--	FIL
Kiskitto Lake (T)								
54° 16' 98° 30'	N. pike	4	0.30	0.57	0.75	75	100	FIL
	Walleye	3	0.30	0.39	0.47	--	100	FIL
	Whitefish	1	--	0.07	--	--	--	FIL
Cross Lake								
54° 45' 97° 30'	N. pike	2	0.37	0.48	0.59	50	100	FWI
	N. pike	2	0.19	0.34	0.50	50	50	FIL
	Walleye	1	--	0.39	--	--	100	FWI
	Walleye	16	0.17	0.37	0.49	--	94	FIL
	Sturgeon	1	--	0.11	--	--	--	FWI
	Whitefish	6	0.05	0.08	0.17	--	--	FIL

TABLE 4. Cont'd.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
Drunken Lake (T) 54° 31' 98° 27'	N. pike	1	--	0.66	--	100	100	FIL
	Walleye	1	--	0.65	--	100	100	FIL
	Whitefish	1	--	0.16	--	--	--	FIL
	Sucker sp.	1	--	0.23	--	--	--	FIL
Walker Lake (T) 54° 42' 96° 57'	Walleye	8	0.17	0.23	0.27	--	25	FIL
	Whitefish	2	0.03	0.04	0.04	--	--	FIL
Duck Lake 54° 52' 98° 11'	N. pike	9	0.25	0.47	0.85	22	100	FIL
	Walleye	9	0.19	0.46	0.64	11	?	FIL
	Goldeye	3	0.15	0.17	0.19	--	--	FIL
Between Duck and Sipiwesk L.	N. pike	1	--	0.82	--	100	100	FWI
	Sturgeon	1	--	0.08	--	--	--	FWI
Sipiwesk Lake 55° 05' 97° 35'	N. pike	14	0.42	0.88	1.71	93	100	FIL
	Walleye	1	--	0.78	--	100	100	FWI
	Walleye	12	0.69	0.88	1.00	100	100	FIL
	Whitefish	1	--	0.06	--	--	--	FWI
	Whitefish	3	0.13	0.17	0.21	--	--	FIL
	Goldeye	8	0.14	0.28	0.60	12	38	FIL
Lauchon Lake (T) 55° 30' 96° 27'	N. pike	1	--	0.60	--	100	100	FIL
	Whitefish	1	--	0.14	--	--	--	FIL
Split Lake 56° 08' 96° 15'	N. pike	7	0.24	0.56	1.09	57	86	FIL
	Walleye	5	0.61	0.73	0.94	100	100	FIL
	Sturgeon	1	--	0.14	--	--	--	FWI
	Whitefish	1	--	0.06	--	--	--	FWI
	Whitefish	2	0.04	0.09	0.14	--	--	FIL
Nelson River (undesignated)	Sturgeon	4	0.09	0.11	0.13	--	--	FIL
	Sucker sp.	1	--	0.23	--	--	--	FIL

TABLE 4. Cont'd.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
GRASS RIVER								
Deming Lake 54° 53' 101° 07'	N. pike	1	--	0.24	--	--	--	FWI
Herblet Lake (T) 54° 53' 99° 48'	Whitefish	1	--	0.08	--	--	--	FIL
Lakwa Lake (T) 54° 51' 98° 53'	Walleye	1	--	0.38	--	--	100	FIL
	Whitefish	1	--	0.07	--	--	--	FIL
Letting Lake 55° 00' 98° 38'	Walleye	1	--	0.19	--	--	--	FIL
Wintering Lake (T) 55° 23' 97° 43'	N. pike	1	--	0.28	--	--	100	FIL
	Walleye	1	--	0.15	--	--	--	FIL
	Whitefish	1	--	0.08	--	--	--	FIL
Partridge Crop Lake 55° 38' 97° 27'	Walleye	1	--	0.41	--	--	100	FIL
	Whitefish	1	--	0.07	--	--	--	FIL
Pikwitonei Lake (T) 55° 33' 97° 03'	N. pike	4	0.12	0.16	0.20	--	--	FIL
	Walleye	3	0.19	0.22	0.26	--	33	FIL
	Whitefish	2	0.05	0.15	0.25	--	50	FIL
	Cisco sp.	2	0.06	0.07	0.07	--	--	FIL
BURNWOOD RIVER								
Muskwatim Lake 55° 32' 98° 32'	Walleye	1	--	0.34	--	--	100	FIL
	Whitefish	2	0.08	0.08	0.08	--	--	FIL

TABLE 5. Mercury levels in fish sampled from the Hayes River system in Manitoba.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
Washahigan Lake 53° 55' 96° 54'	N. pike	1	--	0.60	--	100	100	FWI
	Walleye	1	--	0.18	--	--	--	FWI
Molson Lake 54° 12' 96° 45'	N. pike	1	--	0.23	--	--	--	FIL
	Walleye	1	--	0.24	--	--	--	FIL
	Lake trout	1	--	0.10	--	--	--	FIL
	Whitefish	1	--	0.08	--	--	--	FIL
Knee Lake 55° 03' 94° 45'	N. pike	1	--	0.12	--	--	--	FIL
	Walleye	1	--	0.09	--	--	--	FIL
	Whitefish	1	--	0.03	--	--	--	FIL
Seller Lake 55° 00' 94° 30'	N. pike	1	--	0.42	--	--	100	FIL
	Walleye	1	--	0.36	--	--	100	FIL
	Whitefish	1	--	0.06	--	--	--	FIL
Bigstone Lake 53° 42' 95° 44'	N. pike	1	--	0.50	--	100	100	FIL
	Walleye	1	--	0.29	--	--	100	FIL
	Whitefish	1	--	0.06	--	--	--	FIL
Island Lake 53° 47' 94° 25'	N. pike	1	--	0.32	--	--	100	FIL
	Walleye	1	--	0.14	--	--	--	FIL
	Lake trout	1	--	0.35	--	--	100	FIL
	Whitefish	1	--	0.06	--	--	--	FIL
Goose Lake 54° 14' 94° 33'	N. pike	1	--	0.34	--	--	100	FIL
	Walleye	1	--	0.28	--	--	100	FIL
	Whitefish	1	--	0.29	--	--	100	FIL
Stevenson Lake 53° 55' 96° 09'	N. pike	1	--	0.07	--	--	--	FIL
	Walleye	1	--	0.14	--	--	--	FIL
	Whitefish	1	--	0.08	--	--	--	FIL

TABLE 5. Cont'd.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
Gods Lake								
54° 40' 94° 15'	N. pike	1	--	0.21	--	--	--	FWI
	Walleye	1	--	0.20	--	--	--	FWI
	Lake trout	1	--	0.30	--	--	100	FWI
	Whitefish	1	--	0.07	--	--	--	FWI
	Cisco sp.	1	--	0.08	--	--	--	FWI
Colen Lake								
54° 33' 95° 25'	N. pike	1	--	0.17	--	--	--	FIL
	Walleye	1	--	0.09	--	--	--	FIL
	Whitefish	1	--	0.12	--	--	--	FIL
Kistigan Lake								
54° 37' 92° 35'	N. pike	1	--	0.29	--	--	100	FIL
	Walleye	1	--	0.30	--	--	100	FIL
	Whitefish	1	--	0.16	--	--	--	FIL
Atkinson Lake								
55° 59' 94° 48'	N. pike	1	--	0.28	--	--	100	FIL
	Walleye	1	--	0.21	--	--	--	FIL
	Whitefish	1	--	0.28	--	--	100	FIL
High Hill Lake								
55° 34' 95° 42'	N. pike	1	--	0.29	--	--	100	FIL
	Walleye	1	--	0.20	--	--	--	FIL
	Whitefish	2	0.07	0.11	0.15	--	--	FIL
Silsby Lake								
55° 29' 95° 46'	N. pike	1	--	0.12	--	--	--	FIL
	Walleye	1	--	0.30	--	--	100	FIL
	Whitefish	1	--	0.36	--	--	100	FIL
Utik Lake								
55° 16' 96° 00'	Walleye	1	--	0.25	--	--	100	FIL
	Lake trout	1	--	0.10	--	--	--	FIL
	Whitefish	1	--	0.10	--	--	--	FIL
Stupart Lake								
55° 37' 94° 08'	Walleye	1	--	0.44	--	--	100	FIL
	Whitefish	1	--	0.06	--	--	--	FIL

TABLE 6. Mercury levels in fish sampled from the mainstream of the Winnipeg River in Manitoba. All samples tested by the Freshwater Institute.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25
			Min.	Mean	Max.		
Eaglenest Lake							
50° 18' 95° 13'	N. pike	1	--	3.06	--	100	100
	Walleye	1	--	2.77	--	100	100
Pointe du Bois to Slave Falls							
50° 18' 95° 33' to	N. pike	1	--	1.09	--	100	100
50° 14' 95° 34'	Walleye	1	--	4.14	--	100	100
	Yellow perch	1	--	0.74	--	100	100
Nutimik Lake							
50° 09' 95° 41'	Mooneye	1	--	0.36	--	--	100
Dorothy Lake							
50° 10' 95° 45'	N. pike	1	--	0.95	--	100	100
	Walleye	1	--	1.52	--	100	100
	Yellow perch	1	--	0.55	--	100	100
	Whitefish	1	--	0.25	--	--	100
Eleanor Lake							
50° 07' 95° 50'	Yellow perch	2	0.51	0.64	0.76	100	100
	Mooneye	1	--	0.43	--	--	100
	Whitefish	1	--	0.36	--	--	100
	White sucker	1	--	0.60	--	100	100
	N. redhorse	1	--	0.77	--	100	100
Lac du Bonnet							
50° 22' 95° 55'	N. pike	2	0.98	1.04	1.09	100	100
	Walleye	2	0.88	1.82	2.76	100	100
	Sauger	1	--	1.77	--	100	100
	Yellow perch	2	0.69	0.77	0.89	100	100
	Mooneye	1	--	0.24	--	--	--
	Whitefish	2	0.26	0.26	0.27	--	100
McArthur Falls to Great Falls							
50° 24' 95° 59' to	N. pike	1	--	1.19	--	100	100
50° 27' 96° 01'	Walleye	1	--	0.19	--	--	--
	Yellow perch	1	--	0.37	--	--	100
Great Falls to Pine Falls							
50° 27' 96° 01' to	N. pike	1	--	0.88	--	100	100
50° 34' 96° 13'	Walleye	1	--	1.64	--	100	100
	Yellow perch	1	--	0.31	--	--	100

TABLE 6. Cont'd.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.2
			Min.	Mean	Max.		
Pine Falls to Traverse Bay							
50° 34' 96° 13'							
50° 39' 96° 24' to	N. pike	1	--	0.71	--	100	10
	Walleye	1	--	0.57	--	100	10
	Sauger	1	--	0.71	--	100	10
Winnipeg River							
(undesignated)	N. pike	1	--	1.42	--	100	10
	Walleye	1	--	1.43	--	100	10
	Mooneye	1	--	1.00	--	100	10
	Burbot	2	0.24	0.34	0.43	--	5
	Whitefish	2	0.17	0.24	0.30	--	5

TABLE 7. Mercury levels in fish sampled from tributary waters of the Winnipeg River in Manitoba. All samples tested by the Freshwater Institute.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25
			Min.	Mean	Max.		
WINNIPEG RIVER							
Crowduck Lake 50° 08' 95° 15'	N. pike	1	--	0.13	--	--	--
	Bass	1	--	0.17	--	--	--
WHITESHELL RIVER							
Caddy Lake 49° 49' 95° 13'	N. pike	1	--	0.16	--	--	--
	Walleye	1	--	0.85	--	100	100
	Yellow perch	1	--	0.03	--	--	--
Whiteshell Lake 50° 05' 95° 21'	N. pike	1	--	0.06	--	--	--
	Walleye	2	0.09	0.16	0.22	--	--
	Yellow perch	1	--	0.06	--	--	--
Betula Lake 50° 05' 95° 35'	Walleye	1	--	0.40	--	--	100
BIRD RIVER							
Bird River 50° 24' 95° 46'	N. pike	1	--	0.26	--	--	100
	Sauger	1	--	0.57	--	100	100
	Yellow perch	1	--	0.17	--	--	--
Bird Lake 50° 29' 95° 20'	Walleye	1	--	0.39	--	--	100
	Yellow perch	1	--	0.16	--	--	--
RENNIE RIVER							
Brereton Lake 49° 54' 95° 33'	N. pike	1	--	0.14	--	--	--
	Walleye	1	--	0.40	--	--	100
Redrock Lake 49° 59' 95° 32'	N. pike	1	--	0.08	--	--	--

TABLE 8. Mercury levels in fish from the Red River in Manitoba and from Pelican Lake and Rock Lake on the Pembina River. Analyses were performed by the Freshwater Institute.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25
			Min.	Mean	Max.		
RED RIVER							
Emerson 49° 00' 97° 12'	N. pike	1	--	1.11	--	100	100
	Sucker sp.	1	--	0.27	--	--	100
	Carp	1	--	0.22	--	--	--
St. Norbert 49° 46' 97° 09'	N. pike	1	--	0.86	--	100	100
	Sucker sp.	1	--	0.11	--	--	--
Lockport 50° 05' 96° 56'	N. pike	1	--	0.68	--	100	100
	Walleye	3	0.46	0.50	0.57	33	100
	Sauger	3	0.49	0.71	0.87	67	100
	FW drum	1	--	0.30	--	--	100
	Burbot	1	--	0.18	--	--	--
Selkirk 50° 09' 96° 52'	N. pike	2	0.44	0.64	0.84	50	100
	Sauger	1	--	0.35	--	--	100
	Sucker sp.	1	--	0.09	--	--	--
	Catfish	1	--	0.20	--	--	--
Netley Creek 50° 17' 96° 52'	N. pike	1	--	0.74	--	100	100
	Walleye	1	--	0.66	--	100	100
	FW drum	2	0.26	0.34	0.42	--	100
	Carp	1	--	0.37	--	--	100
PEMBINA RIVER (T)							
Pelican Lake 49° 20' 99° 32'	N. pike	1	--	0.05	--	--	--
	Yellow perch	1	--	0.09	--	--	--
Rock Lake 49° 13' 99° 12'	N. pike	2	0.19	1.00	1.82	50	50
	Yellow perch	1	--	0.14	--	--	--

TABLE 9. Mercury levels in fish from the Assiniboine River in Manitoba.

Location	Species	Mean Hg (ppm)	Agency
Above Shellmouth Dam	N. pike	0.25	EHL
Below Shellmouth Dam	N. pike	0.36	EHL
	N. pike	0.28	FWI
	Walleye	0.55	FWI
	White sucker	0.23	FWI
	N. redhorse sucker	0.16	FWI
Above Brandon	Walleye	0.75	EHL
Below Brandon (Glen Souris)	N. pike	0.29	FWI
	Sauger	0.73	FWI
	Sucker sp.	0.74	FWI
Treesbank	N. pike	0.29	EHL
	Walleye	0.64	EHL
Holland	N. pike	0.26	EHL
	Walleye	0.36	EHL
	Sauger	0.59	EHL
Portage la Prairie	N. pike	0.37	EHL
	Sauger	0.52	EHL
	Sauger	1.69	FWI
	Sucker sp.	0.40	FWI
	Flathead chub	0.41	FWI

TABLE 10. Mercury levels in fish from the Souris River in Manitoba.
(T) indicates tributary waters.

Location	Species	Mean Hg (ppm)	Agency
Above Coulter Dam	N. pike	0.39	EHL
Above Souris Dam	N. pike	0.39	EHL
Oak Lake (T)	N. pike	0.23	FWI
	Walleye	0.37	FWI
Above Wawanesa Dam	N. pike	0.44	EHL
	Walleye	0.74	EHL

TABLE 11. Mercury levels in fish from Clear Lake and the Minnedosa River.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
CLEAR LAKE								
51° 22' 98° 33'								
East End	N. pike	2	0.11	0.16	0.21	--	--	FWI
	Walleye	2	0.22	0.25	0.28	--	50	FWI
	Yellow perch	1	--	0.16	--	--	--	FWI
	Whitefish	1	--	0.37	--	--	100	FWI
	Cisco sp.	1	--	0.13	--	--	--	FWI
	Sucker sp.	2	0.07	0.10	0.13	--	--	FWI
West End	Whitefish	1	--	0.12	--	--	--	FWI
	Sucker sp.	1	--	0.11	--	--	--	FWI
North Shore	N. pike	1	--	0.15	--	--	--	FWI
	Walleye	1	--	0.20	--	--	--	FWI
	Lake trout	1	--	0.83	--	100	100	FWI
	Whitefish	1	--	0.09	--	--	--	FWI
Dead on Beach	N. pike	1	--	0.65	--	100	100	FWI
MINNEDOSA RIVER								
Minnedosa Reservoir	N. pike	1	--	0.11	--	--	--	EHL
	Yellow perch	1	--	0.09	--	--	--	EHL
Rivers Reservoir	N. pike	1	--	0.10	--	--	--	EHL
	Yellow perch	1	--	0.59	--	100	100	EHL

TABLE 12. Mercury levels in fish from miscellaneous waters in Manitoba.

Location	Species	No. of Samples	Hg - ppm			% ≥ 0.5	% ≥ 0.25	Agency
			Min.	Mean	Max.			
William Lake 53° 54' 99° 21'	Burbot	1	--	0.12	--	--	--	FWI
	Whitefish	1	--	0.08	--	--	--	FIL
Lake Manitoba 51° 00' 98° 45'	N. pike	5	0.03	0.25	0.94	20	20	FWI
	Walleye	4	0.05	0.10	0.15	--	--	FWI
	Sauger	3	0.12	0.14	0.19	--	--	FWI
	Yellow perch	1	--	0.07	--	--	--	FWI
	Sucker sp.	3	0.04	0.09	0.08	--	--	FWI
	Carp	1	--	0.16	--	--	--	FIL
Lake Winnipegosis 52° 30' 100° 00'	N. pike	6	0.04	0.12	0.19	--	--	FWI
	N. pike	4	0.15	0.22	0.29	--	50	FIL
	Walleye	5	0.08	0.13	0.20	--	--	FWI
	Walleye	4	0.12	0.16	0.22	--	--	FIL
	Sauger	4	0.12	0.12	0.13	--	--	FWI
	Sauger	4	0.20	0.24	0.33	--	25	FIL
	Yellow perch	1	--	0.13	--	--	--	FWI
	Sucker sp.	5	0.02	0.04	0.07	--	--	FWI
	Sucker sp.	1	--	0.08	--	--	--	FIL
	Whitefish	1	--	0.03	--	--	--	FWI
	Whitefish	1	--	0.09	--	--	--	FIL
	Goldeye	2	0.06	0.06	0.06	--	--	FWI
	Goldeye	2	0.09	0.11	0.13	--	--	FIL
Bell Lake 52° 32' 101° 15'	N. pike	1	--	0.08	--	--	--	FWI
	Walleye	1	--	0.21	--	--	--	FWI
Wellman Lake 51° 49' 100° 54'	N. pike	1	--	0.27	--	--	100	FWI
	Walleye	1	--	0.24	--	--	--	FWI
	Yellow perch	1	--	0.15	--	--	--	FWI
Steeprock Lake 52° 35' 101° 22'	N. pike	1	--	0.15	--	--	--	FWI
	Whitefish	1	--	0.03	--	--	--	FWI
Whitefish Lake 52° 20' 101° 36'	N. pike	1	--	0.19	--	--	--	FWI
	Walleye	2	0.55	0.90	1.24	100	100	FWI
	Lake trout	1	--	0.28	--	--	100	FWI
	Yellow perch	1	--	0.42	--	--	100	FWI

TABLE 12. Cont'd.

Location	Species	No. of Samples	Hg - ppm			≥0.5	≥0.25	Agency
			Min.	Mean	Max.			
Waterhen Lake 52° 06' 99° 34'	N. pike	1	--	0.20	--	--	--	FWI
	Walleye	1	--	0.33	--	--	100	FWI
	Yellow perch	1	--	0.15	--	--	--	FWI
Childs Lake 51° 36' 101° 05'	N. pike	1	--	0.26	--	--	100	FWI
	Splake	1	--	0.11	--	--	--	FWI
	Lake trout	1	--	0.13	--	--	--	FWI
Lake Dauphin 51° 17' 99° 48'	N. pike	1	--	0.12	--	--	--	FWI
	Walleye	1	--	0.09	--	--	--	FWI
	Sucker sp.	1	--	0.02	--	--	--	FWI
Crane River 51° 32' 99° 17'	N. pike	1	--	0.16	--	--	--	FWI
	Walleye	1	--	0.16	--	--	--	FWI
	Sauger	1	--	0.22	--	--	--	FWI
	Yellow perch	1	--	0.17	--	--	--	FWI
Lake St. Martin 51° 37' 98° 29'	N. pike	1	--	0.23	--	--	--	FWI
	Walleye	1	--	0.21	--	--	--	FWI
	Yellow perch	1	--	0.12	--	--	--	FWI
	Sucker sp.	1	--	0.07	--	--	--	FWI
Falcon Lake 49° 42' 95° 15'	N. pike	5	0.19	0.39	0.59	40	80	FWI
	Walleye	2	0.25	0.25	0.25	--	100	FWI
	Yellow perch	1	--	0.13	--	--	--	FWI
	Whitefish	2	0.04	0.06	0.08	--	--	FWI
Moose Lake 49° 12' 95° 19'	N. pike	1	--	0.24	--	--	--	FWI
Long Lake 50° 52' 95° 25'	Walleye	1	--	0.30	--	--	100	FWI
Wanipigow Lake 51° 07' 96° 00'	N. pike	1	--	0.25	--	--	100	FWI
	Walleye	1	--	0.33	--	--	100	FWI

TABLE 12. Cont'd.

Location	Species	No. of Samples	Hg - ppm			% ≥0.5	% ≥0.25	Agency
			Min.	Mean	Max.			
Aikens Lake 51° 12' 95° 20'	Walleye	1	--	1.53	--	100	100	FWI
Fishing Lake 52° 08' 95° 24'	Walleye	1	--	0.73	--	100	100	FWI
Family Lake 51° 54' 95° 27'	N. pike	1	--	0.29	--	--	100	FWI
	Walleye	1	--	0.32	--	--	100	FWI
Sasaginnigak Lake 51° 36' 95° 39'	Walleye	1	--	0.63	--	100	100	FWI
	Walleye	1	--	0.82	--	100	100	FIL
Dogskin Lake 51° 43' 95° 12'	Walleye	1	--	0.49	--	--	100	FWI
Whitefish Lake 54° 45' 101° 40'	Whitefish	1	--	0.06	--	--	--	FIL
Harrop Lake 52° 38' 96° 00'	N. pike	1	--	0.54	--	100	100	FWI
	Walleye	1	--	0.50	--	100	100	FWI