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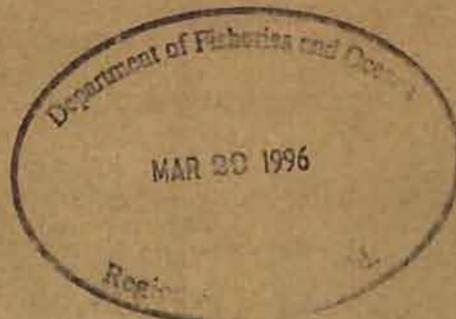
A Guide To The Great Lakes Fisheries Specimen Bank Data Base (1977 to 1994)

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**Canadian Data Report of
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Canadian Data Report of Fisheries and Aquatic Sciences

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ABSTRACT

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Since 1977 the Department of Fisheries and Oceans (DFO) has maintained a specimen bank at the Great Lakes Laboratory for Fisheries and Aquatic Sciences (GLLFAS) located at the Canada Centre for Inland Waters in Burlington, Ontario. The Great Lakes Fisheries Specimen Bank (GLFSB), a complementary program to the department's ongoing Great Lakes Contaminants Surveillance Program, maintains homogenized whole fish samples for future retrospective analysis of contaminants. The bulk of this program's activities have focused on defining the effects of long-term frozen storage conditions on the integrity of pesticide or organochlorine residues in archived biological tissues. In 1983, with the acquisition of commercial ultra-low temperature freezers, allowing storage at -80°C, the scope of the specimen bank was expanded to include a limited selection of invertebrates that represent the lower trophic levels of the Great Lakes' food webs. In 1988 this archive was expanded outside the Great Lakes basin with the inclusion of samples of both freshwater and marine species collected under the DFO portion of the Canadian National Dioxin Program and samples collected from a co-operative arctic environmental monitoring program conducted with the Department of Indian Affairs and Northern Development (DIAND). This data report provides a complete description of the samples represented within this specimen bank and the associated database.

RÉSUMÉ

Kiriluk, R.M., J.F. Gorrie, A.A. Carswell, D.M. Whittle, and M.J. Keir. 1996. A Guide To The Great Lakes Fisheries Specimen Bank Data Base (1977 to 1994). Can. Data Rept. Fish. Aquat. Sci. No. 973. pp. i-vi, 1-50.

Depuis 1977, le ministère des Pêches et des Océans (MPO) possède au Laboratoire des Grands Lacs pour les pêches et les sciences aquatiques, situé au Centre canadien des eaux intérieures à Burlington (Ontario), une banque de spécimens d'espèces aquatiques. Cette banque, qui joue un rôle complémentaire à celui du Programme de surveillance des contaminants des Grands Lacs, détient des échantillons homogénéisés de poissons entiers en vue des futurs dosages rétrospectifs des contaminants. Le gros des activités du programme vise la définition des effets du stockage sous congélation à long terme sur l'intégrité des résidus de pesticides ou d'organochlorés dans les tissus biologiques archivés. En 1983, grâce à l'acquisition de congélateurs commerciaux à très basse température, permettant l'entreposage à -80 °C, on a pu élargir la portée de la banque de spécimens à quelques invertébrés qui représentent les niveaux inférieurs des réseaux trophiques des lacs. En 1988, la banque s'est ouverte à l'extérieur des Grands Lacs avec l'inclusion de spécimens d'espèces dulcicoles et marines prélevés dans le cadre du volet du Programme national sur les dioxines relevant du MPO, et d'échantillons provenant d'un programme coopératif de surveillance environnementale de l'Arctique mené avec le ministère des Affaires indiennes et du Nord. Notre rapport donne une description exhaustive des échantillons représentés dans la banque de spécimens et la base de données associée.

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INTRODUCTION

Archiving of tissues or environmental samples provides a source of material for retrospective analysis of the historical presence of persistent toxic substances such as heavy metals or organic contaminants. These types of samples have been particularly useful in describing the historical environmental distribution of previously unidentified contaminants such as mirex (Kaiser 1978) or toxaphene (Lewis 1987). They have also been used to describe the historical trends of individual PCB congeners that could not be adequately detected at time of collection with the existing technology (Turle et al. 1991). More recently, Huestis et al. (1996) described the historical trends of PCB congeners, dioxin, and furans in Lake Ontario lake trout using archive samples retrieved from the Great Lakes Fisheries Specimen Bank (GLFSB). Additional activities under the GLFSB program have focused on defining the effects of long-term frozen storage at -20°C, -80°C, and -196°C on the integrity of organochlorine residues in archived biological tissues (Hyatt et al. 1986; Kiriluk et al. 1996).

In 1977, the Great Lakes Contaminants Surveillance Program (GLCSP) and its complementary program, the GLFSB, were established to meet the Department of Fisheries and Oceans commitment to the Great Lakes Water Quality Agreement (GLWQA) between Canada and the United States (Hyatt et al. 1993). Under the requirements of Annexes 11 and 12 of the GLWQA (IJC 1989), a collection of more than 10,000 samples of homogenized fish tissue sampled from 1977 through to the present from the Canadian Great Lakes are currently being stored in the GLFSB. Under these annexes, the two programs provide a long term database through annual monitoring of contaminant levels in Great Lakes aquatic biota and further form the basis for an early warning system for the detection of emerging contaminant issues in the Great Lakes aquatic community. With the 1983 acquisition of ultra-low temperature freezers, allowing storage at -80°C, the scope of the specimen bank was expanded to include a limited selection of benthic invertebrates and plankton. In 1988 the scope of this program was further expanded outside the Great Lakes basin such that it is now actually a National Fisheries Specimen Bank (Hyatt et al. 1993). Samples of both marine and freshwater species collected under the Canadian National Dioxin Sampling Program (Whittle et al. 1993) and samples collected under a co-operative arctic environmental monitoring program conducted with the Department of Indian Affairs and Northern Development (DIAND) were processed in the GLCSP laboratory and replicate samples were placed in the GLFSB. Samples or holdings originating under these two programs (Dioxin and DIAND) have been described elsewhere (Wakeford and Braune, 1993). The purpose of this data report is to provide a summary of samples and sample types or forms represented in the GLFSB and to provide a general description of methods utilized in collection, preparation, and long-term storage of these samples.

METHODS

STATIONS

The sampling areas or stations for the Great Lakes Contaminants Surveillance Program were selected to represent offshore conditions in distinct basin regions of each of the Canadian Great Lakes. Stations are identified with reference to adjacent islands, points of land, or local urban centres. General location, latitude, and longitude of these sampling areas or stations are summarized in Table 1 and Figure 1.

SAMPLING PROGRAM

A) Biological Parameters

When fish are processed in the laboratory samples are given a unique Contaminants Surveillance Program Number (CSP No.) and data are entered according to species, capture site, capture method and processing date, number of fish (total collected, individual vs. composite sample) and the following parameters:

- wet weight
- total length
- fork length
- sex
- reproductive stage
- age (fin clip combination, coded wire tag, calcified structures)
- extent of lamprey scarring

B) Chemical Parameters

Samples collected under the Great Lakes Contaminants Surveillance Program and placed in GLFSB are routinely analysed for the following:

Trace Metals (TM)

- mercury
- copper
- nickel
- zinc
- lead
- cadmium
- chromium
- arsenic
- selenium

Organochlorine Pesticide Residues (PEST)

- heptachlor epoxide
- hexachlorobenzene
- α chlordane
- γ chlordane
- dieldrin
- p,p' DDE
- o,p' DDT
- p,p' DDD
- mirex

Total Polychlorinated Biphenyls (PCB)

FIELD COLLECTIONS

A) Fish

The majority of top predator and forage fish collections were carried out by DFO personnel. Assistance from other government agencies is also enlisted, including the Ontario Ministry of Natural Resources, New York State Department of Environmental Conservation, and U.S. National Biological Survey (formerly U.S. Fish and Wildlife Service). In rare situations, collections are undertaken by private individuals, such as professional consultants under contract to DFO, or by commercial fishermen. All external collection sources were provided with appropriate contaminant-free storage materials and detailed instructions for the capture, storage, and shipping of all samples.

The methods of capture depend on the species to be collected. Predatory fish such as lake trout (*Salvelinus namaycush*) or walleye (*Stizostedion vitreum*), were collected with bottom sets of gill nets with stretched mesh sizes ranging from 6.35 to 15.25 cm. Forage species such as alewife (*Alosa pseudoharengus*), rainbow smelt (*Osmerus mordax*), or slimy sculpin (*Cottus cognatus*) were collected with a 6 m modified Biloxi outboard bottom trawl (Dadswell 1975) equipped with a 2 m cod end of 50 mm stretched mesh.

Immediately after collection, all fishes were sorted, placed in food grade resin U.S. EPA (Environmental Protection Agency)-approved contaminant-free plastic bags (ARCAN Inc., Plainwell, Michigan), and transported to the laboratory in an insulated container packed with dry ice. From 1977 to 1986, fish were wrapped in pesticide grade acetone-hexane rinsed aluminum foil. In 1987 foil was replaced with contaminant-free plastic bags.

B) Benthic Invertebrates

All benthic invertebrate sample collections were carried out by DFO personnel with an epibenthic sled (Elster 1933). Samples were collected, processed in the field, and transported to the laboratory as described in Hyatt (1986).

C) Net Plankton

All net plankton sample collections were carried out by DFO personnel using Wisconsin type nets (0.5 m opening diameter, 1.5 m long; 153 μm mesh) towed horizontally at the subsurface at depths of approximately 1 meter, avoiding prolonged contact with the water surface layer. Samples were collected, processed in the field, and transported to the laboratory as described in Hyatt (1986).

LABORATORY PREPARATION

A) Fish

At the laboratory all fish were thawed, weighed, measured, sexed, and then homogenized a minimum of five times with a commercial meat grinder. All equipment and processing instruments were washed between each sample, rinsed in distilled water, acetone, and hexane. Larger fish, such as lake trout, were prepared individually as whole fish, while smaller fish, such as alewife, smelt and sculpin, were processed as composites of five or more similar-sized individuals. Prior to homogenization, depending on the species, calcified structures (scales, otoliths, opercula, or fin rays) were removed for ageing. Only with lake trout, ages determined from calcified structures could be confirmed from a combination of fin clips or through the removal of snouts from fish with adipose clips that provide coded wire tags (CWT) for a more accurate confirmation of ages (Elrod and Schneider 1986).

Two aliquots of approximately 50 g each were removed from the fish homogenate for routine pesticide and metal analyses under the Great Lakes Contaminants Surveillance Program. Two additional aliquots of approximately 100 g each were removed for storage, one at -20°C and the other at -80°C (prior to 1983 only storage at -20°C was available) in the Great Lakes Fisheries Specimen Bank. All sample containers consisted of solvent-rinsed (acetone/hexane) flint glass jars with shrink seal bands applied to prevent cap movement during storage. Solvent-rinsed aluminum foil was applied as a liner to screw cap closures.

B) Benthic Invertebrates

All benthic invertebrate samples are stored at -80°C ($\pm 2^\circ\text{C}$) in the GLFSB in the same containers (acetone-hexane rinsed aluminum ointment tins) in which they were initially placed during field collections.

C) Net Plankton

All net plankton samples are stored at -80°C ($\pm 2^\circ\text{C}$) in the GLFSB in the same containers (acetone-hexane rinsed aluminum ointment tins) in which they were initially placed during field collections.

STORAGE CONDITIONS

A) Fish

All individual whole fish and fish composite homogenates placed in the GLFSB prior to 1983 have been stored in domestic household chest freezers at 20°C (\pm 5°C). With the acquisition of -80°C (\pm 2°C) ultra-low temperature freezers in 1983, replicates have been, and are currently, archived under both storage conditions.

B) Benthic Invertebrates

Since 1983, all benthic invertebrate samples have been stored in the GLFSB at -80°C (\pm 2°C). Prior to 1983 a limited number of samples were either preserved in Davidson's "B" solution (50% ethanol, 10% formaldehyde, 10% glycerol, 30% distilled water by volume) or maintained in a dried form at room temperature.

C) Net Plankton

Since 1983 all net plankton samples have been stored in the GLFSB at -80°C (\pm 2°C). Prior to 1983 a limited number of samples were either preserved in a buffered sugar formalin (4%) solution or maintained in a dried form at room temperature.

DATABASE MANAGEMENT

All data files associated with all sample types and forms maintained within the GLFSB were compiled and modified for inclusion into a currently existing database management system developed and modified by a consultant (Bio-Software, Hamilton, Ontario) under contract to DFO. The commercial software, EDAMS (Environmental Data Analysis and Management System), was initially developed by the consultant in co-operation with the federal Departments of Environment and Fisheries and Oceans for the management of vast amounts of collected scientific monitoring data and environmental impact information (Gorrie et al. 1994). EDAMS was customized to provide the ability to import, update, summarize, and query all data or information associated with samples represented in the GLFSB.

DATABASE SUMMARIES

Information associated with samples represented in the GLFSB is summarized in the appendices. Summaries are listed based on three levels of organization. The first two levels summarize both fish and invertebrate samples according to species and lake, based on year of collection (Appendix 1a) and by species and lake, based on site of collection (Appendix 1b). The third level of organization (Appendix 2a - fish and 2b - invertebrates) is based on year of collection and lake and describes species, collection site, number of archived samples, month of collection, and individual age range (where applicable).

Information associated with samples collected and processed under the Canadian National Dioxin Sampling Program and represented in the GLFSB are summarized in Appendix 3. The collection, processing, and analyses of these samples are described in Whittle et al. (1993). Information associated with samples collected under a co-operative arctic environmental monitoring program conducted with the Department of Indian Affairs and Northern Development (DIAND), processed in the DFO GLCSP laboratory and represented in the GLFSB are summarized in Appendix 4. The collection, processing, and analyses of these samples are described in Peddle et al. (1995). The tissue types that were processed and which currently exist in the GLFSB stored at -20°C (\pm 5°C), are described in Appendix 3 and 4 as follows:

form	description
BF	body fluids
BLB	blubber
CAN	canned product
COMP	composite - whole individuals
COMP-F	composite - fillets
DGL	digestive gland
EGGS	eggs
GN	gonad
GREASE	grease
HPP	hepatopancreas
L	liver
MSC	invertebrate muscle tissue (exoskeleton removed)
PASTE	paste
ROE	roe
SFT	soft tissue
SINGLE	individual whole fish
SINGLE-F	individual fish - fillets
VSC	viscera

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REFERENCES

- Dadswell, M.J. 1975. A small-boat otter trawl for limnological studies. *J. Fish. Res. Board Can.* 32: 2535-2538.
- Elrod, J.H., and C.P. Schneider. 1986. Evaluation of coded wire tags for marking lake trout. *N. Am. J. of Fish. Manage.* 6:264-271.
- Elster, H.J. 1933. Eine Schlitten-Dredge. *Int. Rev. Gesamtem Hydrbiol. Hydrogr.* 29: 290-292.
- Gorrie, J.F., S.M. Backus, M.E. Comba, J. Biberhofer, D.M. Whittle, and K.L.E. Kaiser. 1994. EDAMS: Environmental Data Analysis and Management System. Poster presentation at the 37th conference of the International Association for Great Lakes Research (IAGLR) and Estuarine Research Federation (ERF), University of Windsor (June 5-9, 1994), Windsor, Ontario.
- Huestis S.Y., M.R. Servos, D.M. Whittle, and D.G. Dixon. 1996. Temporal and age related concentration trends for polychlorinated biphenyl congeners and organochlorine contaminants in Lake Ontario lake trout (*Salvelinus namaycush*). *J. Great Lakes Res.* In press.
- Hyatt, W.H. 1986. A Compendium of Field Methods Used by the Great Lakes Research Branch. A Report to the Surveillance Work Group of the Great Lakes Water Quality Board, International Joint Commission, 30 p.

- Hyatt, W.H., J.D. Fitzsimons, M.J. Keir, and D.M. Whittle. 1986. Biological tissue archive studies. *Can. Tech. Rep. Fish. Aquat. Sci.* 1497. pp. i-iv, 1-58.
- Hyatt, W.H., M.J. Keir, and D.M. Whittle. 1993. The Great Lakes Fisheries Specimen Bank. *Sci. Total Environ.* 139/140: 123-138.
- IJC. 1989. Revised Great Lakes Water Quality Agreement of 1978, as amended by Protocol signed November 18, 1987.
- Kaiser, K.L.E. 1978. The rise and fall of mirex. *Environ. Sci. Technol.* 12: 520-528.
- Kiniuk, R.M., W.H. Hyatt, M.J. Keir, and D.M. Whittle. 1996. Fluctuations in levels of total PCB, organochlorine residues, lipid, and moisture in whole lake trout homogenate samples during four years of frozen storage. *Can. Tech. Rept. Fish. Aquat. Sci.* No. 2091. pp. i-iv, 1-28.
- Lewis, R.A. 1987. Guidelines for environmental specimen banking with special reference to the Federal Republic of Germany, US MAB Report No. 12, US Department of the Interior, National Park Service, 182 p.
- Peddie, J.D., C. Lafontaine, G. Stevens, K. Robertson, and P. Taylor. 1995. Slave River Environmental Quality Monitoring Program. Interim Data Report. Water Resources Division, Yellowknife, Northwest Territories.
- Turle, R., R.J. Norstrom, and B. Collins. 1991. Comparison of PCB quantitation methods: re-analysis of archived specimens of herring gull eggs from the Great Lakes. *Chemosphere* 22: 201-213.
- Wakeford, B., and B.M. 1993. Arctic Specimen Bank Catalogue. Technical Report No. 184, Canadian Wildlife Service, Hull, Quebec.
- Whittle, D.M., C. Mageau, R.K. Duncan, D.B. Sergeant, M.D. Nassichuk, J. Morrison, and J. Piuze. 1993. Canadian National Dioxin Sampling Program: Dioxins and furans in biota near 46 pulp and paper mills using the chlorine bleaching process. *Chemosphere* 27: 279-286.

Table 1. Sampling areas for the Great Lakes Contaminants Surveillance Program. Map location numbers refer to corresponding areas numbered on map in Figure 1.

<u>LAKE</u>	<u>SITE</u>	<u>MAP LOCATION</u>	<u>LATITUDE (NORTH)</u>	<u>LONGITUDE (WEST)</u>
ONTARIO	Cornwall / St. Lawrence River	1	44°03'	74°40'
	Eastern Basin / Main Duck Is.	2	44°05'	76°40'
	Point Traverse	3	43°50'	76°50'
	Bay of Quinte - Big Bay	4	44°08'	78°43'
	Port Hope - Cobourg	5	43°55'	78°10'
	Port Credit	6	43°30'	79°35'
	Streetsville - Credit River	7	43°35'	79°45'
	Burlington	8	43°15'	79°45'
	Niagara-on-the-Lake / Vineland	9	43°20'	79°05'
	Grimsby / 50 Mile Point	10	42°15'	79°34'
ERIE	Port Colborne	11	42°52'	79°15'
	Long Point Bay	12	42°40'	80°15'
	South of Long Point	13	42°30'	80°05'
	Dunkirk	14	42°36'	79°20'
	South of Erieau	15	42°10'	81°45'
	Wheatley	16	42°00'	82°15'
	Pele Island / Western Basin	17	41°55'	82°40'
	Amherstburg	18	43°00'	83°10'
ST. CLAIR	Fighting Island / Detroit River	19	42°06'	83°07'
	St. Clair River	20	42°20'	82°40'
		21	42°40'	82°30'

Table 1. continued

<u>LAKE</u>	<u>SITE</u>	<u>MAP LOCATION</u>	<u>LATITUDE (NORTH)</u>	<u>LONGITUDE (WEST)</u>
HURON	Owen Sound - Cape Rich	22	44°42'	80°35'
	French River	23	45°55'	80°50'
	Southampton	24	44°30'	81°25'
	Goderich	25	43°45'	81°50'
	South Baymouth (bay area)	26	45°30'	82°00'
	South Baymouth (lake area)	27	45°33'	82°02'
	Point Edward	28	43°05'	82°20'
	Burnt Island	29	45°45'	82°55'
	North Channel	30	45°55'	83°30'
	Spanish River	31	46°10'	81°55'
SUPERIOR	Whitefish Bay	32	46°35'	84°45'
	Michipicoten	33	47°45'	85°15'
	Michipicoten Island	34	47°40'	85°50'
	Marathon	35	48°40'	86°25'
	Jackfish Bay	36	48°40'	87°00'
	Thunder Bay - Pie Island	37	48°15'	89°00'
	Marquette	38	46°15'	87°35'
	Jarvis Bay	39	47°50'	89°30'
	Welcome Island	40	48°21'	89°08'
	Frankfort	41	44°39'	86°13'
MICHIGAN	Port Washington	42	43°23'	87°54'
	Saugatuck	43	42°40'	86°11'
NIPIGON	Virgin Island	44	49°50'	88°30'
SIMCOE	Georgina Island	45	44°25'	79°20'

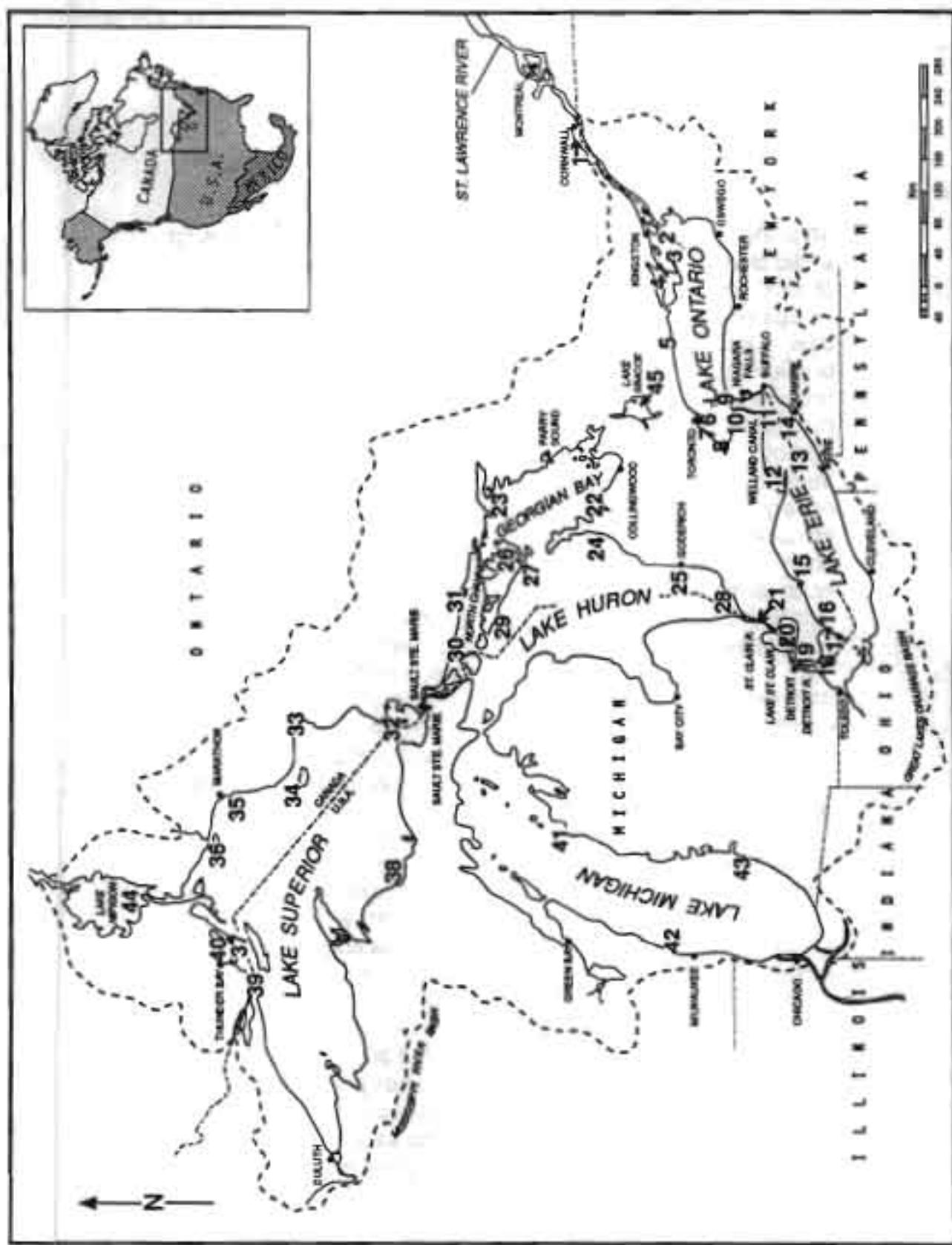


Figure 1: Map of the Great Lakes basin with sampling areas for the Great Lakes Contaminants Surveillance Program. Numbers refer to Map Locations in Table 1.

Table 2. Common name and taxonomic description (scientific name where possible) of freshwater and marine species represented in the Great Lakes Fisheries Specimen Bank. Includes all species collected under both the Great Lakes Contaminants Surveillance Program and the Canadian National Dioxin Sampling Program.

Common name	Taxonomic description
abalone	<i>Haliotis kamtschatkana</i>
alewife	<i>Alosa pseudoharengus</i>
american eel	<i>Anguilla rostrata</i>
amphipod	<i>Diporeia hoyi, Gammarus sp.</i>
arctic char	<i>Salvelinus alpinus</i>
atlantic cod	<i>Gadus morhua</i>
beluga whale	<i>Delphinapterus leucas</i>
blue mussel	<i>Mytilus edulis</i>
brook trout	<i>Salvelinus fontinalis</i>
brown trout	<i>Salmo trutta</i>
bull trout	<i>Salvelinus confluentus</i>
burbot	<i>Lota lota</i>
butter clam	<i>Saxidomus giganteus</i>
canary rockfish	<i>Sebastes pinniger</i>
chinook salmon	<i>Oncorhynchus tshawytscha</i>
chum salmon	<i>Oncorhynchus keta</i>
coho salmon	<i>Oncorhynchus kisutch</i>
common carp	<i>Cyprinus carpio</i>
coonsstriped shrimp	<i>Pandalus danae</i>
	<i>Pandalus franciscorum</i>
crab (w)	<i>Cancer sp.</i>
crayfish	<i>Astacidae</i>
cutthroat trout	<i>Oncorhynchus clarkii</i>
deepwater sculpin	<i>Myoxocephalus thompsoni</i>
dogfish shark	<i>Squalus acanthias</i>
dolly varden	<i>Salvelinus malma</i>
dungeness crab	<i>Cancer magister</i>
english sole	<i>Solea vulgaris, Solea solea</i>
eulachon	<i>Thaleichthys pacificus</i>
fallfish	<i>Semotilus corporalis</i>
flatfish	<i>Pleuronectidae</i>
freshwater drum	<i>Aplodinotus grunniens</i>
geoduck clam	<i>Panopea abrupta</i>
goldeye	<i>Hiodon alosoides</i>
gooseneck barnacle	<i>Pollicipes polymerus</i>
greenstripe rockfish	<i>Sebastes elongatus</i>
grilse	<i>Salmo salar</i>
kelp greenling	<i>Hexagrammos decagrammus</i>

Table 2. continued

Common name	Taxonomic description
kokanee	<i>Oncorhynchus nerka</i>
lake trout	<i>Salvelinus namaycush</i>
lake whitefish	<i>Coregonus clupeaformis</i>
largemouth bass	<i>Micropterus salmoides</i>
limpets	Gastropoda
ling cod	<i>Ophiodon elongatus</i>
little-neck clam	Veneridae
lobster	<i>Homarus americanus</i>
longnose sucker	<i>Catostomus catostomus</i>
mountain whitefish	<i>Prosopium williamsoni</i>
muskellunge	<i>Esox masquinongy</i>
mussel (w)	<i>Mytilus</i> sp., <i>Crenomytilus</i> sp.
mysid	<i>Mysis relicta</i>
narwhal whale	<i>Monodon monoceros</i>
northern pike	<i>Esox lucius</i>
northern squawfish	<i>Ptychocheilus oregonensis</i>
oyster (w)	<i>Crassostrea gigas</i>
pacific herring	<i>Clupea harengus pallasi</i>
pearmouth	<i>Mylocheilus caurinus</i>
pink salmon	<i>Oncorhynchus gorbuscha</i>
pink shrimp	Pandalidae
pollock	<i>Theragra chalcogramma</i>
prickly sculpin	<i>Cottus asper</i>
quillback rockfish	<i>Sebastodes maliger</i>
rainbow smelt	<i>Osmerus mordax</i>
rainbow trout	<i>Oncorhynchus mykiss</i>
rat fish	<i>Hydrolagus colliei</i>
red snapper	<i>Lutjanus campechanus</i>
redhorse sucker	<i>Moxostoma</i> sp.
redrock crab	<i>Cancer productus</i>
ringed seal	<i>Phoca hispida</i>
rock cod	<i>Sebastodes</i> sp.
rock crab	<i>Cancer irroratus</i>
rock scallop	<i>Hinnites giganteus</i>
sea cucumber	Holothuroidea
sea urchin	Echinoidea
sidestripe shrimp	<i>Pandalopsis dispar</i>
slender sole	<i>Eopsetta exilis</i>
slimy sculpin	<i>Cottus cognatus</i>
smallmouth bass	<i>Micropterus dolomieu</i>
sockeye salmon	<i>Oncorhynchus nerka</i>

Table 2. continued

Common name	Taxonomic description
softshell clam	<i>Mya arenaria</i>
spiny waterflea	<i>Bythotrephes cederstroemi</i>
splake	<i>Salvelinus fontinalis</i> x <i>namaycush</i>
staghorn sculpin	<i>Leptocottus armatus</i>
starry flounder	<i>Platichthys stellatus</i>
striped bass	<i>Morone saxatilis</i>
tom cod	<i>Microgadus tomcod</i>
turbot	<i>Reinhardtius hippoglossoides</i>
walleye	<i>Stizostedion vitreum</i>
white bass	<i>Morone chrysops</i>
white sturgeon	<i>Acipenser transmontanus</i>
white sucker	<i>Catostomus commersoni</i>
yellow perch	<i>Perca flavescens</i>
yelloweye rockfish	<i>Sebastodes ruberrimus</i>

Appendix 1a. Summary of samples represented in the Great Lakes Fisheries Specimen Bank. Listings are based on the species collected, lake, and year of collection. Number of samples in parentheses.

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan
Lake Trout	1977 (10) 1978 (32) 1979 (6) 1980 (55) 1981 (88) 1982 (129) 1983 (132) 1984 (122) 1985 (20)	1984 (5) 1985 (7) 1987 (19) 1988 (39) 1990 (50) 1991 (52) 1992 (25) 1993 (28) 1994 (41)	1980 (19) 1981 (7) 1982 (73) 1983 (41) 1984 (23) 1986 (34) 1987 (42) 1988 (45) 1989 (33)	1980 (42) 1981 (29) 1982 (43) 1983 (83) 1984 (65) 1985 (50) 1986 (70) 1987 (45) 1988 (26)	1987 (6)
	1986 (155) 1987 (192) 1988 (179) 1989 (73) 1990 (184) 1991 (204) 1992 (201) 1993 (180) 1994 (199)	1986 (155) 1987 (192) 1988 (179) 1989 (73) 1990 (184) 1991 (204) 1992 (201) 1993 (180) 1994 (199)	1990 (47) 1991 (84) 1992 (103) 1993 (37) 1994 (30)	1989 (32) 1990 (143) 1991 (48) 1992 (49) 1993 (145)	
Rainbow Smelt	1977 (1) 1978 (4) 1979 (2) 1980 (6) 1981 (1) 1982 (5) 1983 (18) 1984 (9) 1985 (10) 1986 (1) 1990 (2) 1992 (1)	1978 (9) 1980 (17) 1981 (8) 1982 (4) 1983 (5) 1986 (1) 1987 (7) 1993 (22)	1980 (4) 1981 (13) 1985 (12) 1987 (3) 1993 (13) 1994 (6)	1981 (5) 1983 (3) 1984 (2) 1986 (1) 1989 (1) 1993 (1)	1991 (10)

Appendix 1a. continued

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan
Rainbow Smelt	1993 (24) 1994 (10)				
Alewife	1990 (1) 1993 (5) 1994 (5)		1993 (5)		1991 (10)
Pink Salmon	1983 (10)		1979 (3) 1983 (9)	1983 (10)	
Coho Salmon	1977 (33) 1978 (24) 1979 (2) 1980 (20) 1981 (29) 1982 (15)		1977 (13) 1979 (5) 1980 (20) 1981 (31) 1982 (58) 1983 (31) 1984 (41)		
Rainbow Trout		1977 (32) 1978 (10) 1980 (10) 1981 (10) 1982 (12)		1981 (10) 1983 (36)	
Brown Trout	1981 (2)			1988 (4)	
Splake					1979 (7) 1980 (18) 1983 (38) 1985 (37) 1987 (47) 1988 (50)

Appendix 1a. continued

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan
Splake			1989 (24) 1990 (44)		
Lake Whitefish	1993 (2) 1994 (10)	1993 (2) 1994 (12)	1993 (5) 1994 (10)	1992 (10) 1993 (14)	
Northern Pike		1978 (7)		1992 (11)	
White Sucker	1988 (1)			1992 (10)	
Common Carp		1984 (4) 1986 (3) 1987 (1)			
Burbot	1993 (2)	1993 (10) 1994 (13)	1992 (20) 1993 (5)	1992 (2) 1993 (2)	
White Bass			1994 (10)		
Yellow Perch			1981 (9)	1977 (2), 1978 (28)	
Walleye	1982 (45) 1985 (3) 1988 (53) 1991 (37) 1993 (10) 1994 (35)	1977 (8) 1978 (34) 1979 (4) 1980 (16) 1981 (28) 1982 (25)	1980 (8) 1981 (10) 1984 (44) 1994 (45)		

Appendix 1a. continued

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan
Walleye					
	1986 (53)				
	1987 (37)				
	1988 (50)				
	1989 (50)				
	1990 (24)				
	1991 (30)				
	1992 (50)				
	1993 (35)				
	1994 (55)				
Freshwater Drum					
	1993 (6)				
	1994 (10)				
	1987 (2)				
Slimy Sculpin					
	1993 (12)				
	1994 (3)				
		1987 (3)			
		1993 (3)			
Deepwater Sculpin					
		1993 (5)			
Net Plankton					
	1986 (2)	1984 (1)	1985 (2)	1985 (1)	
	1989 (1)	1985 (3)	1986 (3)	1989 (1)	
	1990 (4)	1986 (2)	1990 (1)	1990 (3)	
	1991 (4)	1992 (1)	1991 (2)	1991 (1)	
	1992 (3)	1993 (4)	1992 (2)	1992 (2)	
	1993 (7)	1994 (4)	1993 (1)	1993 (2)	
	1994 (8)	1995 (4)	1994 (1)	1994 (1)	
	1995 (2)		1995 (2)		
Gammarus					
		1993 (1)			
		1994 (2)			
		1995 (1)			

Appendix 1a. continued

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan
Diporeia	1984 (4) 1985 (3) 1986 (1) 1988 (1) 1989 (5) 1990 (7) 1991 (5) 1992 (6) 1993 (6) 1994 (6) 1995 (2)	1985 (2) 1989 (1) 1990 (1) 1991 (1) 1992 (1) 1993 (1) 1994 (2) 1995 (2)	1984 (4) 1985 (2) 1986 (4) 1987 (3) 1988 (3) 1989 (2)	1989 (2) 1990 (1) 1991 (1) 1992 (2) 1993 (2)	
Bythotrephes		1989 (1) 1990 (1)	1991 (1)		
Crayfish			1990 (1)		
Isopods	1984 (1) 1988 (2)	1989 (1)	1990 (1)		

Appendix 1a, continued

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan	
Mysis	1983 (1) 1984 (2) 1985 (1) 1986 (1) 1987 (2) 1988 (1) 1989 (4) 1990 (6) 1991 (6) 1992 (7) 1993 (6) 1994 (6) 1995 (2)	1990 (1)	1984 (3) 1985 (1) 1986 (3) 1989 (2) 1990 (2)	1989 (2) 1990 (1) 1991 (1) 1992 (2) 1993 (2)		
Chironomid			1991 (4) 1992 (2) 1993 (1) 1994 (1) 1995 (2)	1990 (1) 1991 (1)	1989 (1)	
Clam				1985 (1) 1995 (1)		

Appendix 1a. continued

SPECIES	Great Lakes Basin
Lake Trout	1993 (10) 1992 (50)
Northern Pike	1992 (10)
White Sucker	1992 (10) 1987 (1)
Freshwater Drum	1987 (3)
Common Carp	1986 (1)
Yellow Perch	1986 (1)
Walleye	1986 (3)
Net Plankton	1986 (1) 1991 (1) 1992 (1)
Gammarus	1992 (1)

This page contains 10 copies of the Great Lakes Basin Fish and Wildlife Survey Results for 1992.

Appendix 1b. Summary of samples collected from 1977 to 1994 and represented in the Great Lakes Fisheries Specimen Bank. Listings are based on the species collected, lake, and collection site. Number of samples in parentheses.

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan
Lake Trout	Burlington (30) Eastern Basin (557) Grimsby - 50 Mile Pt (51) Niagara-on-the-Lake (552) Point Traverse (11) Port Credit (633) Port Hope - Cobourg (327)	Dunkirk (42) Long Point Bay (93) Port Colborne (84) South of Long Point (47)	Burnt Island (22) Goderich (15) North Channel (160) Owen Sound (137) Point Edward (274) South Baymouth (10)	Jackfish Bay (126) Jarvis Bay (30) Marathon (69) Marquette (10) Michipicoten (30) Michipicoten Island (10) Thunder Bay - Pie Is (386) Whitefish Bay (209)	Saugatuck (6)
Rainbow Smelt	Eastern Basin (34) Grimsby - 50 Mile Pt (14) Niagara-on-the-Lake (8) Port Credit (25) Port Hope - Cobourg (13)	Dunkirk (5) Long Point Bay (8) Pelee Island (22) Port Colborne (1) South of Erieau (26) South of Long Point (5) Wheatley (3) Amherstburg (3)	Burnt Island (6) French River (4) Goderich (14) Owen Sound (19) Point Edward (8)	Marathon (2) Michipicoten (5) Thunder Bay - Pie Is (2) Whitefish Bay (4)	Port Washington (5) Frankfort (5)
Alewife	Port Credit (1) Port Hope - Cobourg (4) Eastern Basin (1) Grimsby - 50 Mile Pt (4)		Goderich (5)		Port Washington (5) Frankfort (5)
Pink Salmon	Port Hope - Cobourg (10)	Long Point Bay (12)	North Channel (10)		
Coho Salmon	Vineland (53) Port Credit (19) Streetsville - Credit R (51)	Long Point Bay (80) Pelee Island (93) South of Erieau (26)			

Appendix 1b, continued

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan
Rainbow Trout	Port Hope - Cobourg (74)	Long Point Bay (38) Pelee Island (8)			
Brown Trout	Niagara-on-the-Lake (2)	Port Colborne (4)			
Splake			North Channel (135) Owen Sound (130)		
Lake Whitefish	Eastern Basin (10) Port Hope - Cobourg (2)	Dunkirk (12) Long Point Bay (2)	Goderich (15)	Marathon (14) Thunder Bay - Pie I (10)	
Northern Pike		Long Point Bay (7)		Thunder Bay (11)	
White Sucker		Quinte - Big Bay (1)		Thunder Bay (10)	
Common Carp			Fighting Island - Detroit R (4) Amherstburg (4)		
Burbot	Port Hope - Cobourg (2)	Dunkirk (20) Long Point Bay (3)	Goderich (25) North Channel (10)	Thunder Bay - Pie I (2) Whitefish Bay (2)	
White Bass			South of Erieau (9)		
Yellow Perch				Long Point Bay (10) Pelee Island (6) South of Erieau (14) Wheatley (5)	

Appendix 1b, continued

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan
Walleye	Bay of Quinte (45) Bay of Quinte (85) Quinte - Big Bay (53)	Pelee Island (563) South of Erieau (25) Amherstburg (4)	French River (107)		
Freshwater Drum		Pelee Island (16) Amherstburg (2)	Goderich (3)	Marathon (1) Whitefish Bay (2)	Port Washington (5) Frankfort (5)
Slimy Sculpin		Grimsby - 50 Mile Pt (11) Port Hope - Cobourg (4)	Goderich (5)	Marathon (2)	
Deepwater Sculpin					
Net Plankton	Eastern Basin (3) Grimsby - 50 Mile Pt (6) Maitland (1)	Amherstberg (8) Long Point Bay (1) Middle Sister Island (2) Port Colborne (2) Port Dover (5) Port Hope - Cobourg (9)	Blind River (1) Goderich (5) Killarney (1) Manitoulin Island (1) Meaford (1) Meldrum Bay (1) Sarnia (1) South Baymouth (1) Spanish River (1) Thessalon (1)	Marathon (1) Thunder Bay (5) Whitefish Bay (3)	
Gammarus				Amherstberg (3) Port Dover (1)	
Diporeia	Bay of Quinte (1) Bay of Quinte - Lennox (2) Eastern Basin (2) Grimsby - 50 Mile Pt (9) Main Duck Island (3)	Long Point Bay (1) Port Dover (5)	Blind River (3) Goderich (10) Grand Bend (1) Killarney (1) Manitoulin Island (1)	Marathon (1) Thunder Bay (4) Whitefish Bay (3)	

Appendix 1b. continued

SPECIES	Lake Ontario	Lake Erie	Lake Huron	Lake Superior	Lake Michigan
Diporeia	Niagara-on-the-Lake (8) Port Credit (12) Port Hope - Cobourg (9)		Meadford (1) Meidrum Bay (4) South Baymouth (6) Spanish River (1) Thessalon (1)		
Bythotrephes		Port Dover (2)		Thessalon (1)	
Crayfish			Spanish River (1)		
Isopods	Bay of Quinte (2) Bay of Quinte - Len (1)	Port Dover (1)	Spanish River (1)		
Mysis	Eastern Basin (2) Grimsby - 50 Mile Pt (8) Main Duck Island (1) Niagara-on-the-Lake (10) Port Credit (10) Port Hope - Cobourg (14)	Port Dover (1)	Goderich (7) Grand Bend (1) Killarney (1) Manitoulin Island (1) Meadford (1) Meidrum Bay (3) South Baymouth (5) Spanish River (1) Thessalon (1)	Marathon (1) Thunder Bay (4) Whitemouth Bay (3)	
Chironomid			Bay of Quinte (1) Whitby (1) Whitby Harbour (2)	South Baymouth (1) Spanish River (1)	Thunder Bay (1)
Clam				Port Colborne (1) Port Dover (1)	

Appendix 1b. continued

SPECIES	Great Lakes Basin
Lake Trout	Virgin Island / Lake Nipigon (5) Georgina Island / Lake Simcoe (5)
Northern Pike	Cornwall (10)
White Sucker	Cornwall (10) Lake St. Clair (1)
Freshwater Drum	Lake St. Clair (3)
Common Carp	Lake St. Clair (1)
Yellow Perch	Lake St. Clair (1)
Walleye	Lake St. Clair (3)
Net Plankton	Cornwall (2) Lake St. Clair (1)
Gammarus	Cornwall (1)

Appendix 2a. Detailed summary of fish species collected in the Great Lakes basin for which archive samples are represented in the Great Lakes Fisheries Specimen bank. These summaries are based on the year of collection and lake from which they were collected.

1977 - ONTARIO

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Rainbow Smelt	Port Hope - Cobourg	1	May	-
Coho Salmon	Port Credit	1	Aug	3
Coho Salmon	Streetsville - Credit River	17	Oct	2-3
Coho Salmon	Vineland	15	Apr	2
Rainbow Trout	Port Hope - Cobourg	32	Apr May	1,3-6
Lake Trout	Eastern Basin	10	Jul	2-3,5

1977 - ERIE

Yellow Perch	Long Point Bay	1	Jul	-
Yellow Perch	South of Erieau	1	Jul	-
Walleye	Pelee Island	8	May	1-6
Coho Salmon	Pelee Island	13	May Oct	2-3

1978 - ONTARIO

Rainbow Smelt	Port Credit	1	Aug	-
Rainbow Smelt	Port Hope - Cobourg	3	Aug	-
Coho Salmon	Streetsville - Credit River	12	Nov	3
Coho Salmon	Vineland	12	Apr	2
Rainbow Trout	Port Hope - Cobourg	10	Apr May	3-5
Lake Trout	Port Credit	12	Aug	2-3
Lake Trout	Eastern Basin	8	Jul	1,3-4,6
Lake Trout	Point Traverse	8	Aug	3-4,6
Lake Trout	Port Hope - Cobourg	4	Aug	3,6

1978 - ERIE

Rainbow Smelt	Wheatley	3	Aug	-
Rainbow Smelt	Pelee Island Western	6	Oct	-
Northern Pike	Long Point Bay	7	May	4-7,9
Yellow Perch	Long Point Bay	9	May	3-7
Yellow Perch	South of Erieau	13	May	2-5,7-8
Yellow Perch	Wheatley	5	May	2-4,6
Yellow Perch	Pelee Island Western	1	Jul	5
Walleye	Pelee Island Western	34	Jul Aug Nov	1-5

Appendix 2a. continued

1979 - ONTARIO

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Rainbow Smelt	Port Hope - Cobourg	2	Aug	-
Coho Salmon	Streetsville - Credit River	2	Nov	3
Lake Trout	Eastern Basin	2	Jul	4
Lake Trout	Point Traverse	3	Aug	3,5,7
Lake Trout	Port Hope - Cobourg	1	Aug	3

1979 - ERIE

Walleye	Pelec Island	4	Nov	5-7
Pink Salmon	Long Point Bay	3	Sep	2
Coho Salmon	Long Point Bay	1	Oct	3
Coho Salmon	South of Erieau	2	Oct	2
Coho Salmon	Pelec Island Western	2	Oct	3

1979 - HURON

Splake	Owen Sound	7	Aug	2-6
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1980 - ONTARIO

Rainbow Smelt	Port Credit	2	Aug	-
Rainbow Smelt	Eastern Basin	3	Jul	-
Rainbow Smelt	Port Hope - Cobourg	1	Aug	-
Coho Salmon	Streetsville - Credit River	10	Nov	2-3
Coho Salmon	Vineland	10	Apr	2
Rainbow Trout	Port Hope - Cobourg	10	Apr	4-7
Lake Trout	Port Credit	21	Aug	3-5
Lake Trout	Burlington	8	Sep	3-5
Lake Trout	Eastern Basin	17	Jul	2-4,6-7
Lake Trout	Port Hope - Cobourg	9	Aug	3-4

1980 - ERIE

Rainbow Smelt	South of Erieau	7	Oct Dec	-
Rainbow Smelt	Pelec Island Western	10	Oct	-
Walleye	Pelec Island Western	16	Aug Nov	2,5-7,9
Coho Salmon	Long Point Bay	10	Oct	3
Coho Salmon	Pelec Island Western	10	Nov	2-3

Appendix 2a. continued

1980 - HURON

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Rainbow Smelt	Owen Sound	3	Aug	-
Rainbow Smelt	Burnt Island	1	Aug	-
Walleye	French River	8	Jun	2,6,9,11
Lake Trout	Burnt Island	19	Aug	3,5-7
Splake	Owen Sound	18	Aug	1-6

1980 - SUPERIOR

Lake Trout	Thunder Bay	42	Aug	3-7
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1981 - ONTARIO

Rainbow Smelt	Eastern Basin	1	Jul	-
Coho Salmon	Port Credit	18	Oct Dec	2-3
Coho Salmon	Vineland	11	Apr	2
Rainbow Trout	Port Hope - Cobourg	10	Apr	3-8
Brown Trout	Niagara-on-the-Lake	2	Jul	3-4
Lake Trout	Port Credit	25	Aug	2-7
Lake Trout	Burlington	22	Jul	3-6
Lake Trout	Eastern Basin	14	Jul	2-6
Lake Trout	Port Hope - Cobourg	8	Aug	2,4-5,9
Lake Trout	Niagara-on-the-Lake	19	Jul	2-4

1981 - ERIE

Rainbow Smelt	Long Point Bay	4	Oct	-
Rainbow Smelt	South of Erieau	4	Oct	-
White Bass	South of Erieau	9	Nov	-
Walleye	Pelec Island Western	28	Sep	2-8
Coho Salmon	Long Point Bay	7	Oct	3
Coho Salmon	South of Erieau	13	Sep	2
Coho Salmon	Pelec Island Western	11	Sep Oct Nov	2
Rainbow Trout	Long Point Bay	10	Nov	3-6

1981 - HURON

Rainbow Smelt	French River	4	Sep	-
Rainbow Smelt	Point Edward	4	Oct	-
Rainbow Smelt	Burnt Island	5	Oct	-

Appendix 2a. continued

1981 - HURON continued

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Walleye	French River	10	Sep	3.5-6
Lake Trout	Point Edward	4	Oct	3-5
Lake Trout	Burnt Island	3	Oct	5.7

1981 - SUPERIOR

Rainbow Smelt	Michipicoten	5	May	-
Lake Trout	Michipicoten	20	Sep	3-6
Lake Trout	Marathon	9	May	4-7

1982 - ONTARIO

Rainbow Smelt	Port Credit	2	Aug	-
Rainbow Smelt	Eastern Basin	3	Jul	-
Walleye	Bay of Quinte	45	Jul	2-4.6
Coho Salmon	Streetsville - Credit River	10	Nov	3
Coho Salmon	Vineland	5	Apr	2
Rainbow Trout	Port Hope - Cobourg	12	Apr	4-6
Lake Trout	Port Credit	30	Aug	3-7
Lake Trout	Eastern Basin	31	Jul	2-3.5-6
Lake Trout	Port Hope - Cobourg	25	Aug	3-4.5
Lake Trout	Niagara-on-the-Lake	42	Sep	2-4.6,10

1982 - ERIE

Rainbow Smelt	Pelec Island Western	4	Nov	-
Walleye	Pelec Island Western	25	Oct	1-8
Coho Salmon	Long Point Bay	27	Oct	2-3
Coho Salmon	South of Erieau	11	Sep	2-3
Coho Salmon	Pelec Island Western	20	Sep	2-3

1982 - HURON

Lake Trout	Point Edward	27	Oct	3-7
Lake Trout	North Channel	46	Sep	2-7

Appendix 2a. continued

1982 - SUPERIOR

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Lake Trout	Whitefish Bay	43	Dec	3-7

1983 - ONTARIO

Rainbow Smelt	Port Credit	12	Aug	-
Rainbow Smelt	Eastern Basin	2	Jul	-
Rainbow Smelt	Niagara-on-the-Lake	4	Aug	-
Pink Salmon	Port Hope - Cobourg	10	Sep	2
Lake Trout	Port Credit	49	Aug	2-8
Lake Trout	Eastern Basin	41	Jul	1-5
Lake Trout	Niagara-on-the-Lake	42	Aug	2-4,6-7,10

1983 - ERIE

Rainbow Smelt	Long Point Bay	4	Oct	-
Rainbow Smelt	South of Erieau	1	Aug	-
Walleye	South of Erieau	23	Nov	1,3-8
Walleye	Pelee Island Western	24	Oct	2-7
Pink Salmon	Long Point Bay	9	Sep	2
Coho Salmon	Long Point Bay	15	Dec	2-3
Coho Salmon	Pelee Island Western	16	Sep	2-3
Rainbow Trout	Long Point Bay	28	Nov	2-7
Rainbow Trout	Pelee Island Western	8	Sep	3-6

1983 - HURON

Pink Salmon	North Channel	10	Aug	2
Lake Trout	North Channel	41	Aug	3-6
Splake	Owen Sound - Cape Rich	38	Aug	2-4

1983 - SUPERIOR

Rainbow Smelt	Whitefish Bay	3	Jun	-
Lake Trout	Whitefish Bay	35	Oct	3-9,12
Lake Trout	Thunder Bay	48	Aug	4-10

Appendix 2a. continued

1984 - ONTARIO

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Rainbow Smelt	Port Credit	6	Jul	-
Rainbow Smelt	Eastern Basin	1	Aug	-
Rainbow Smelt	Niagara-on-the-Lake	2	Sep	-
Lake Trout	Port Credit	51	Jul	1,3-8
Lake Trout	Eastern Basin	44	Jul	2-6
Lake Trout	Niagara-on-the-Lake	27	Sep	2-6

1984 - ERIE

Common Carp	Fighting Island / Detroit R.	4	Jun	6,9
Walleye	Pelee Island Western	46	Jun Sep	1-8
Coho Salmon	Long Point Bay	20	Oct	3
Coho Salmon	Pelee Island Western	21	Sep	3
Lake Trout	Long Point Bay	5	Nov	3

1984 - HURON

Walleye	French River	44	Jul	2-6
Lake Trout	Point Edward	23	Oct	4-7,10

1984 - SUPERIOR

Rainbow Smelt	Marathon	2	Sep	-
Lake Trout	Michipicoten Island	20	Sep	7-12
Lake Trout	Marathon	45	Sep	3-4

1985 - ONTARIO

Rainbow Smelt	Port Credit	2	Aug	-
Rainbow Smelt	Eastern Basin	9	Jul Aug	-
Walleye	Bay of Quinte	3	Apr	3-4,7
Lake Trout	Port Credit	13	Jul Aug	3-6
Lake Trout	Eastern Basin	4	Aug	2
Lake Trout	Niagara-on-the-Lake	3	Sep	2,5-6

1985 - HURON

Rainbow Smelt	Owen Sound	12	Aug	-
Splake	Owen Sound	37	Aug	2,4-5

Appendix 2a. continued

1985 - SUPERIOR

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Lake Trout	Thunder Bay	50	Aug	4

1986 - ONTARIO

Lake Trout	Port Credit	40	Sep	3-8
Lake Trout	Eastern Basin	44	Aug	2-3.5-7
Lake Trout	Grimsby - 50 Mile Point	5	May	3-5
Lake Trout	Port Hope - Cobourg	18	Aug	3-4.6-7
Lake Trout	Niagara-on-the-Lake	48	Sep Oct	2-7

1985 - ERIE

Common Carp	Amherstburg	3	Jun	1,2,5
Rainbow Smelt	Port Colborne	1	Aug	-
Walleye	Pele Island	50	Oct	1-7
Walleye	Amherstburg	3	Jun	9,10
Lake Trout	Port Colborne	4	Jun	3-4
Lake Trout	Long Point Bay	3	Aug Sep	2-3

1986 - HURON

Lake Trout	Point Edward	34	Dec	2-7
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1986 - SUPERIOR

Rainbow Smelt	Thunder Bay - Pie Island	1	Aug	-
Lake Trout	Whitefish Bay	29	Dec	3-6
Lake Trout	Thunder Bay - Pie Island	41	Aug	4-6

1986 - GREAT LAKES BASIN

Common Carp	Lake St. Clair	1	Jun	15
Yellow Perch	Lake St. Clair	1	Jun	3
Walleye	Lake St. Clair	3	Jun	1,2,7

Appendix 2a. continued

1987 - ONTARIO

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Lake Trout	Port Credit	47	Nov Dec	3-8
Lake Trout	Eastern Basin	42	Aug	2-7
Lake Trout	Port Hope - Cobourg	48	Sep	2-8
Lake Trout	Niagara-on-the-Lake	55	Aug-Nov	3-8

1987 - ERIE

Rainbow Smelt	South of Erieau	4	Jul	-
Rainbow Smelt	Amherstburg	3	Jun	-
Walleye	Pele Island	36	Oct	2-8
Walleye	Amherstburg	1	Jun	3
Common Carp	Amherstburg	1	Jun	4
Freshwater Drum	Amherstburg	2	Jun	3,4
Lake Trout	Port Colborne	19	Aug	2-4

1987 - HURON

Rainbow Smelt	Godерich	3	Jun	-
Slimy Sculpin	Godерich	3	Jun	-
Splake	Owen Sound	6	Jun	2-5
Lake Trout	Owen Sound - Cape Rich	42	Aug	2-3,5-8
Splake	North Channel	41	Aug	6

1987 - SUPERIOR

Lake Trout	Whitefish Bay	35	Sep	2-4,6
Lake Trout	Marquette	10	Oct	5-9

1987 - MICHIGAN

Lake Trout	Saugatuck	6	Sep	-
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1987 - GREAT LAKES BASIN

White Sucker	Lake St. Clair	1	Jul	2
Freshwater Drum	Lake St. Clair	3	Jul	2,4

Appendix 2a. continued

1988 - ONTARIO

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
White Sucker	Quinte - Big Bay	1	Aug	4
Walleye	Quinte - Big Bay	53	Aug	2-8
Lake Trout	Port Credit	52	Aug	4-9
Lake Trout	Eastern Basin	48	Sep Aug	2.4-7
Lake Trout	Port Hope - Cobourg	30	Aug	3-9
Lake Trout	Niagara-on-the-Lake	49	Aug	3-8

1988 - ERIE

Walleye	Pelee Island	50	Oct	1-7
Brown Trout	Port Colborne	4	Jun	4-5
Lake Trout	Port Colborne	39	Jun Aug	2-4

1988 - HURON

Lake Trout	Point Edward	45	Dec	3-6
Splake	North Channel	50	Aug	2-7

1988 - SUPERIOR

Lake Trout	Thunder Bay - Pie Island	26	Nov	2-7
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1989 - ONTARIO

Lake Trout	Port Credit	23	Sep	5-11
Lake Trout	Eastern Basin	18	Aug	2-6
Lake Trout	Port Hope - Cobourg	6	Aug	2-3,5-6
Lake Trout	Niagara-on-the-Lake	26	Sep	2-7

1989 - ERIE

Walleye	Pelee Island	50	Oct	2-7
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1989 - HURON

Lake Trout	Point Edward	15	Nov	3
Lake Trout	North Channel	18	Jun Aug	2-5
Splake	Owen Sound - Cape Rich	24	Aug	1-7

Appendix 2a. continued

1989 - SUPERIOR

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Rainbow Smelt	Thunder Bay - Pie Island	1	Jun	-
Lake Trout	Whitefish Bay	16	Oct	3-6
Lake Trout	Thunder Bay - Pie Island	16	Nov	3-7

1990 - ONTARIO

Rainbow Smelt	Port Hope - Cobourg	1	May	-
Rainbow Smelt	Niagara-on-the-Lake	1	Sep	-
Alewife	Port Credit	1	Sep	-
Lake Trout	Port Credit	57	May Sep Oct	3-12
Lake Trout	Eastern Basin	42	Aug	2-10
Lake Trout	Grimsby - 50 Mile Point	1	May	6
Lake Trout	Port Hope - Cobourg	34	May Sep	3-8, 11
Lake Trout	Niagara-on-the-Lake	50	Sep	2-9

1990 - ERIE

Walleye	South of Erieau	2	Oct	7
Walleye	Pele Island	22	Nov	2,4-7
Lake Trout	Port Colborne	22	Jun	2,4-8
Lake Trout	Long Point Bay	28	Aug	3-7

1990 - HURON

Lake Trout	Point Edward	47	Nov	2-4,6-8
Splake	North Channel	44	Aug	2-7

1990 - SUPERIOR

Lake Trout	Thunder Bay - Pie Island	95	Jun Aug	3-8
Lake Trout	Jackfish Bay	49	Aug Sep	2-7

1991 - ONTARIO

Walleye	Bay of Quinte	37	Sep	2-7
Lake Trout	Port Credit	57	May Sep	3-8
Lake Trout	Eastern Basin	49	Aug	2-9
Lake Trout	Grimsby - 50 Mile Point	10	Apr Aug	3,5,7-8

Appendix 2a. continued

1991 - ONTARIO continued

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Lake Trout	Port Hope - Cobourg	38	May Sep	3-10
Lake Trout	Niagara-on-the-Lake	50	Sep	3-11
1991 - ERIE				
Walleye	Pelee Island	30	Oct	1,3-6
Lake Trout	Long Point Bay	52	Sep	2-7
1991 - HURON				
Lake Trout	Owen Sound - Cape Rich	26	Aug	2-6
Lake Trout	South Baymouth - Bay	10	Sep	4-6
Lake Trout	Point Edward	45	Nov	2-7
Lake Trout	North Channel	3	Jul	3
1991 - SUPERIOR				
Lake Trout	Whitefish Bay	24	Jun Oct	4-7
Lake Trout	Jackfish Bay	24	Oct	3-5,7
1991 - MICHIGAN				
Rainbow Smelt	Port Washington	5	Oct	-
Slimy Sculpin	Port Washington	5	Oct	-
Alewife	Port Washington	5	Oct	-
Rainbow Smelt	Frankfort	5	Sep	-
Slimy Sculpin	Frankfort	5	Sep	-
Alewife	Frankfort	5	Sep	-
1992 - ONTARIO				
Rainbow Smelt	Niagara-on-the-Lake	1	Sep	-
Lake Trout	Port Credit	47	Aug Sep	3-10
Lake Trout	Eastern Basin	50	Jul	2-7
Lake Trout	Grimsby - 50 Mile Point	15	Apr-Jun	4-8
Lake Trout	Port Hope - Cobourg	40	May Sep	3-9
Lake Trout	Niagara-on-the-Lake	49	Sep	3-8

Appendix 2a. continued.

1992 - ERIE

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Walleye	Pelée Island	50	Aug Oct	2-8
Lake Trout	Long Point Bay	5	Jul	1,5,7-8
Lake Trout	South of Long Point	20	Aug Sep	3-8

1992 - HURON

Burbot	Goderich	10	Jun	-
Burbot	North Channel	10	Jun	-
Lake Trout	Owen Sound - Cape Rich	51	Aug	5,7,9
Lake Trout	North Channel	52	Jun Aug	1-8

1992 - SUPERIOR

Northern Pike	Inshore - Thunder Bay	11	May Jun	-
White Sucker	Inshore - Thunder Bay	10	May Jun	-
Burbot	Thunder Bay - Pie Island	2	Jun	-
Lake Trout	Thunder Bay - Pie Island	19	Jun	4-6
Lake Trout	Jarvis Bay	30	Aug Oct	2-5
Lake Whitefish	Thunder Bay - Pie Island	10	Jun Jul	-

1992 - GREAT LAKES BASIN

Northern Pike	Cornwall	10	Apr	-
White Sucker	Cornwall	10	Apr May	-

1993 - ONTARIO

Rainbow Smelt	Eastern Basin	10	Jul Sep	-
Rainbow Smelt	Grimsby - 50 Mile Point	9	Apr	-
Rainbow Smelt	Port Hope - Cobourg	5	Apr	-
Burbot	Port Hope - Cobourg	2	Apr	-
Walleye	Bay of Quinte - Lennox	10	Aug	2-3,6,9-10
Slimy Sculpin	Grimsby - 50 Mile Point	4	Apr	-
Slimy Sculpin	Port Hope - Cobourg	4	Apr	-
Alewife	Eastern Basin	1	Sep	-
Alewife	Grimsby - 50 Mile Point	4	Apr	-
Alewife	Port Hope - Cobourg	4	Apr	-
Lake Trout	Port Credit	50	Oct	2-10
Lake Trout	Eastern Basin	43	Jul	2-6

Appendix 2a. continued

1993 - ONTARIO continued

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Lake Trout	Grimsby - 50 Mile Point	10	Apr	-
Lake Trout	Port Hope - Cobourg	35	Apr Sep	4-9
Lake Trout	Niagara-on-the-Lake	42	Sep	3-11
Lake Whitefish	Port Hope - Cobourg	2	Apr	-

1993 - ERIE

Rainbow Smelt	South of Long Point	5	Nov	-
Rainbow Smelt	South of Erieau	10	Jul	-
Rainbow Smelt	Pelee Island	2	Oct	-
Rainbow Smelt	Dunkirk	5	Jul	-
Burbot	Dunkirk	10	Aug	-
Yellow Perch	Pelee Island	5	Aug	-
Walleye	Pelee Island	35	Oct	1-7
Freshwater Drum	Pelee Island	6	Jul	2-3.5
Lake Trout	South of Long Point	6	Jul	-
Lake Trout	Dunkirk	22	Aug Nov	1,3-5,7-10
Lake Whitefish	Long Point Bay	2	May	-

1993 - HURON

Rainbow Smelt	Owen Sound - Cape Rich	4	Oct	-
Rainbow Smelt	Goderich	5	Jun	-
Rainbow Smelt	Point Edward	4	Oct	-
Burbot	Goderich	5	Jun	-
Deepwater Sculpin	Goderich	5	Jun	-
Alewife	Goderich	5	Jun	-
Lake Trout	Owen Sound - Cape Rich	18	Oct	2-7
Lake Trout	Goderich	3	Jun	-
Lake Trout	Point Edward	16	Oct	5-7
Lake Whitefish	Goderich	5	Jun	-

1993 - SUPERIOR

Rainbow Smelt	Whitefish Bay	1	Jun	-
Burbot	Whitefish Bay	2	Jun	-
Slimy Sculpin	Whitefish Bay	2	Jun	-
Slimy Sculpin	Marathon	1	Jun	-
Deepwater Sculpin	Marathon	2	Jun	-

Appendix 2a. continued

1993 - SUPERIOR continued

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Lake Trout	Whitefish Bay	27	Jun Nov	3-5
Lake Trout	Marathon	15	Jun	4-7.9
Lake Trout	Thunder Bay - Pie Island	50	Sep	5-9
Lake Trout	Jackfish Bay	53	May Oct	4-11
Lake Whitefish	Marathon	14	Jun	-

1993 - GREAT LAKES BASIN

Lake Trout	Virgin Island / Nipigon	5	Oct	9-10
Lake Trout	Georgina Island / Simcoe	5	Oct	5-7

1994 - ONTARIO

Rainbow Smelt	Eastern Basin	5	Jul	-
Rainbow Smelt	Grimsby - 50 Mile Point	5	Apr	-
Walleye	Bay of Quinte - Lennox	35	Aug	1-5
Slimy Sculpin	Grimsby - 50 Mile Point	3	Apr	-
Alewife	Grimsby - 50 Mile Point	5	Apr	-
Lake Trout	Port Credit	59	Jul Sep	3-10
Lake Trout	Eastern Basin	50	Jul	2-7
Lake Trout	Grimsby - 50 Mile Point	10	Apr	4-8,10
Lake Trout	Port Hope - Cobourg	30	Sep	3-9
Lake Trout	Niagara-on-the-Lake	50	Aug	1-9
Lake Whitefish	Eastern Basin	10	Sep	3.5-6

1994 - ERIE

Burbot	Long Point Bay	3	Jun	5-6,8
Burbot	Dunkirk	10	Aug	2-3,5-8
Walleye	Pelee Island	55	Jun Oct	1-7
Freshwater Drum	Pelee Island	10	Jun	3-5
Lake Trout	South of Long Point	21	Aug	2-7
Lake Trout	Dunkirk	20	Aug	3-5,8-10
Lake Whitefish	Dunkirk	12	Aug	4

Appendix 2a. continued

1994 - HURON

SPECIES	COLLECTION SITE	TOTAL	MONTH OF COLLECTION	AGE RANGE (YR)
Rainbow Smelt	Goderich	6	Jun	-
Burbot	Goderich	10	Jun	4-7
Walleye	French River	45	Jun	5,7-11
Lake Trout	Goderich	12	Jun	2-5
Lake Trout	Point Edward	18	Oct	5-6
Lake Whitefish	Goderich	10	Jun	-

Appendix 2b. Detailed summary of invertebrates collected in the Great Lakes for which archive samples are represented in the Great Lakes Fisheries Specimen bank. These summaries are based on the species and lake from which they were collected.

LAKE ONTARIO

SPECIES	COLLECTION SITE	TOTAL	YEAR(S) COLLECTED	MONTH(S) COLLECTED
Net Plankton	Port Credit	9	1984, 90, 91, 93-95	Apr, Jul, Sep
	Burlington	1	1984	Sep
	Eastern Basin	3	1992-94	Sep
	Grimsby - 50 Mile Point	6	1986, 92-94	Apr, Oct
	Port Hope - Cobourg	9	1990-95	Apr, Sep
	Niagara-on-the-Lake	4	1989, 90, 93, 94	Sep
	Maitland	1	1986	Jul
Diporeia	Port Credit	12	1984, 85, 89-95	Apr, Oct
	Eastern Basin	2	1992, 94	Sep
	Bay of Quinte - Lennox	2	1984	Aug
	Grimsby - 50 Mile Point	9	1986, 89-94	Apr, Oct
	Port Hope - Cobourg	9	1989-95	Apr, Sep
	Niagara-on-the-Lake	8	1985, 89-94	May, Sep
	Bay of Quinte	1	1988	Aug
	Main Duck Island	3	1984, 85, 90	Aug
Isopod	Bay of Quinte - Lennox	1	1984	Aug
	Bay of Quinte	2	1988	Aug
Mysis	Port Credit	10	1984, 90-95	Apr, Sep
	Eastern Basin	2	1992, 94	Sep
	Grimsby - 50 Mile Point	8	1986, 90-94	Apr, Oct
	Port Hope - Cobourg	14	1984, 85, 87, 89-95	Apr, Sep
	Niagara-on-the-Lake	10	1983, 97-94	May, Sep

Appendix 2b. continued

LAKE ONTARIO		COLLECTION SITE	TOTAL	YEAR(S) COLLECTED	MONTH(S) COLLECTED
SPECIES					
<i>Mysis</i>	Main Duck Island	1	1	1990	Aug
<i>Chironomid</i>	Bay of Quinte Whitby Harbour Whitby Harbour	1 1 2	1990 1987 1991	Aug Sep Sep	
LAKE ERIE					
Net Plankton	Port Colborne Long Point Bay Amherstberg Middle Sister Island Port Dover Port Stanley	2 1 8 2 5 1	1985, 96 1985 1984-86, 94, 95 1993 1982-95 1995	Jun Jul May, Aug Jul May-Aug Jun	
<i>Gammarus</i>	Amherstberg Port Dover	3 1	1994-95 1993	Jun May	
<i>Diporeia</i>	Long Point Bay Port Dover	1 5	1985 1985, 89-92	Jul Jun	
<i>Bythotrephes</i>	Port Dover	2	1989, 90	Jul	
<i>Isopod</i>	Port Dover	1	1989	Jul	
<i>Mysis</i>	Port Dover	1	1990	Jul	

Appendix 2b, continued

LAKE ERIE		COLLECTION SITE	TOTAL	YEAR(S) COLLECTED	MONTH(S) COLLECTED
SPECIES					
Clam		Port Colborne	1	1985	Jun
		Port Dover	1	1995	Jul
LAKE HURON					
Net Plankton		Goderich	5	1986, 92-95	Jun
		Blind River	1	1985	Jun
		Killarney	1	1995	Jun
		Meadford	1	1985	Jun
		Meldrum Bay	1	1992	Jun
		Manitoulin Island	1	1986	Jun
		Samia	1	1986	Jun
		South Baymouth	1	1991	Jul
		Spanish River	1	1990	Jul
		Thessalon	1	1991	Jul
Diporeia		Southampton	1	1984	Jun
		Goderich	10	1984, 85, 87-89, 91-95	Jun
		Blind River	3	1985, 86, 88	Jun
		Grand Bend	1	1984	Jun
		Killarney	1	1995	Jun
		Meadford	1	1987	Jun
		Meldrum Bay	4	1987, 98, 90, 92	Jun
		Manitoulin Island	1	1986	Jun
		South Baymouth	6	1984, 86, 88, 91	Jun
		Spanish River	1	1990	Jul
		Thessalon	1	1991	Jul

Appendix 2b. continued

LAKE HURON		COLLECTION SITE	TOTAL	YEAR(S) COLLECTED	MONTH(S) COLLECTED
SPECIES					
Bythotrephes		Thessalon	1	1991	Jul
Crayfish		Spanish River	1	1990	May
Isopod		Spanish River	1	1990	Jul
Mysis		Goderich	7	1984, 89, 91-95	Jun
		Grand Bend	1	1984	Jun
		Killarney	1	1995	Jun
		Meaford	1	1985	Jun
		Meldrum Bay	3	1989, 90, 92	Jun
		Manitoulin Island	1	1986	Jun
		South Baymouth	5	1984, 86, 91	Jun
		Spanish River	1	1990	Jul
		Thessalon	1	1991	Jul
Chironomid		South Baymouth	1	1991	Jul
		Spanish River	1	1990	Jul

Figs. 1-3

Tables 2-3

Appendix 2b. continued

LAKE SUPERIOR

SPECIES	COLLECTION SITE	TOTAL	YEAR(S) COLLECTED	MONTH(S) COLLECTED
Net Plankton	Whitefish Bay	3	1991-93	Jun
	Marathon	1	1993	Jun
	Thunder Bay	5	1989, 90, 92	Jun
Diporeia	Whitefish Bay	3	1991-93	Jun
	Marathon	1	1993	Jun
	Thunder Bay	4	1989, 90, 92	Jun
Mysis	Whitefish Bay	3	1991-93	Jun
	Marathon	1	1993	Jun
	Thunder Bay	4	1989, 90, 92	Jun
Chironomid	Thunder Bay	1	1989	Jun
GREAT LAKES BASIN				
Net Plankton	Lake St. Clair	1	1986	Jun
	Cornwall	2	1991, 92	Nov
Gammaurus	Cornwall	1	1992	Apr

Appendix 3. Summary of species collected under the Canadian National Dioxin Sampling Program for which archive samples are represented in the Great Lakes Fisheries Specimen bank. These summaries are based on species, year of collection, and province or territory from which they were collected. See text for explanation of sample form.

SPECIES	YEAR(S)	NFLD	PEI	NS	NB	QUE	ONT	MAN	SASK	ALTA	BC	NWT	FORM
limpet	90										1		SFT
clam (west coast)	88,90,91										5		SFT
sea urchin	90										2		GN
sea cucumber	90										1		SFT
littleneck clam	88,89										2		SFT
pink shrimp	88-91										57		MSC
crayfish	89										2		HPP, MSC
redhorse sucker	90												SINGLE
flatfish	88										1		SINGLE-F
mussel (west coast)	86,91										4		SFT
crab (west coast)	88										2		MSC,HPP
rock cod	88										5		SINGLE-F,COMP-F
abalone	90										1		SFT
blue mussel	88-90										1		SFT
rock scallop	88										1		SFT
oyster (west coast)	87,88,90,91										9		SFT
butter clam	88,89										2		SFT, MSC
scallop shell clam	88,89,91										2		SFT
geoduck clam	88										1		SFT
gooseneck barnacle	90										1		SFT
constrained shrimp	90										1		MSC
sidestripe shrimp	88,90										3		PASTE,DGL, MSC, SFT
lobster	84-90												MSC,HPP
redrock crab	88										3		SFT, MSC, HPP
dungeness crab	87-91												COMP-F
rock crab	88,89												SINGLE-F
dogfish shark	88												COMP-F, SINGLE,F,COMP-L
rat fish	88												SINGLE-F
white sturgeon	87-90										7		COMP-F, MSC, COMP-F, COMP-SINGLE
american eel	88-90												COMP-F
gadidye	88												1

Appendix 3. continued

SPECIES	YEAR(S)	NFLD	PEI	NS	NB	QUE	ONT	MAN	SASK	ALTA	BC	NWT	FORM
lake whitefish	87-89										1		SINGLE-F,COMP-F
pink salmon	88										2		CAN,COMP-F
chum salmon	88										4		COMP-F,CAN,SINGLE-F
coho salmon	88,90										10		COMP-F,ROE,COMP
kokanee	87-89										11		COMP,COMP-F,CAN,SINGLE-F,SINGLE
chinook salmon	88										16		COMP-F,SINGLE-F,COMP
cuthroat trout	88,89										2		SINGLE-F,COMP-F
rainbow trout	88,89										2		COMP,COMP-F,SINGLE-F
grilse	89										1		COMP,COMP-F
dolly varden	88,89										5		COMP-F
arctic char	87										3		COMP
lake trout	86,87,89,90										3		SINGLE,COMP-F,SINGLE-F
brook trout	88,89										1		SINGLE-F
bull trout	89										2		COMP,COMP-F
mountain whitefish	88,89										12		COMP,F,COMP
rainbow smelt	89										6		COMP
sturgeon	88,90										21		GREASE,COMP
northern pike	87-90										9		COMP-F,COMP,SINGLE,SINGLE-F
muskellunge	89										1		SINGLE
common carp	90										1		SINGLE-F
tallfinn	89										4		SINGLE,SINGLE-F,COMP,COMP-F
pearlmouth	88										1		COMP-F
northern squawfish	88										12		COMP-F,SINGLE
longnose sucker	87-90										2		COMP,COMP-F,SINGLE
white sucker	86-90										92		COMP-F,SINGLE-F,COMP,SINGLE,VSC
brown bullhead	86,89										10		COMP,COMP-F,SINGLE
tom cod	86										1		COMP-F
pollock	88										6		COMP-F,SINGLE-F
burbot	88-91										6		L,SINGLE-F,COMP-F,COMP
quillback rockfish	88,90										13		SINGLE-F
canary rockfish	88										1		COMP-F
yelloweye rockfish	88,89										2		SINGLE-F
keel greenling	89										1		COMP-F
ling cod	88										1		SINGLE
prickly sculpin	89										1		

Appendix 3, continued

SPECIES	YEAR(S)	NFLD	PEI	NS	NB	QUE	ONT	MAN	SASK	ALTA	BC	NWT	FORM
staghorn sculpin	88										1		COMP-F
striped bass	85,89			7									COMP-F,COMP,SINGLE,SINGLE,F
smallmouth bass	88,89												COMP-F,SINGLE,COMP
largemouth bass	88												SINGLE,SINGLE,F
yellow perch	87,88												COMP-F
red snapper	88												COMP-F
slender sole	86												SINGLE,F
starry flounder	87,90												SINGLE,F,COMP-F,SINGLE,COMP
winter flounder	88,89												COMP-F
english sole	87,88,90			1		3							COMP,COMP,F,L
beluga whale	69												BLB
narwhal	63												BLB
ringed seal	84												MSC
pacific herring	88												COMP-F,ROE
walleye	86-90												COMP-F,SINGLE,F,SINGLE,COMP
total	10	1	22	61	187	177	9	17		57	349	118	1008

Appendix 4. Summary of species collected from a co-operative arctic environmental monitoring program conducted with the Department of Indian Affairs and Northern Development (DIAND) which archive samples are represented in the Great Lakes Fisheries Specimen bank. These summaries are based on species, year of collection, and areas within the Northwest Territories from which they were collected. See text for explanation of sample form. Asterisks denotes samples that are also described in Appendix 3.

SPECIES	YEAR(S)	SLAVE RIVER	LIARD RIVER	LELAND LAKE	CHITTY LAKE	ALEXI LAKE	LAC des GRAS	FORM
lake trout	94	5	10	2			16	SINGLE
lake whitefish	93	5	2	2				SINGLE
northern pike	92	5	9	2				SINGLE
	93	5	2	2				SINGLE,F
	94	5	9	2				SINGLE,L
burbot	92	10	10	10	7	5		SINGLE,L
	93	10	10	10				SINGLE,L
	94	10	10	10				SINGLE,L
	95	10	10	10	5	5		SINGLE,SINGLE,F
walleye	92	10	10	10	5	5		SINGLE,SINGLE,F
	93	10	9	9	5	5		SINGLE,SINGLE,F
	94	10	14	14	5	5		SINGLE,F
longnose sucker	92	10	10	10	8	8		SINGLE
	93	8	21	7	3	5		SINGLE,SINGLE,F
mountain whitefish	92	3	3	3	6			SINGLE
	93	3	3	3				SINGLE
	94	1	12					SINGLE
longnose sucker*	88	1						SINGLE
white sucker*	88	4						SINGLE,SINGLE,F,L
burbot*	88	25						SINGLE,SINGLE,F,L
	89	25						SINGLE,SINGLE,F,L
	90	11						SINGLE,SINGLE,F,L
	91	10						SINGLE,L
walleye*	90	10						SINGLE,SINGLE,F
	91	10						SINGLE,SINGLE,F
Total		169	34	11	137	16	388	