Appendix C
U.S. Fish and Wildlife Data

TABLE 8. PCB LEVELS IN WATERFOWL COLLECTED FROM THE KALAMAZOO RIVER, AUGUST, 1985

LOCATION	SPECIES	MATURITY	PCB AS 1260 (MG/KG)
MORROW POND	MERGANSER	ADULT	28.00
OTSEGO CITY IMPOUNDMENT	MALLARD	ADULT	4.80
	MALLARD	IMMATURE	2.00
	BLUEWINGED TEAL	IMMATURE	<0.25
TROWBRIDGE IMPOUNDMENT	MALLARD	IMMATURE	1.90
	MALLARD	IMMATURE	0.73
ALLEGAN STATE GAME AREA	WOOD DUCK	IMMATURE	1.50
	CANADA GOOSE	IMMATURE	<0.25
SAUGATUCK	MALLARD	IMMATURE	0.78
	MALLARD	IMMATURE	<0.25
	MALLARD	IMMATURE	<0.25
	MALLARD	IMMATURE	0.60
	MALLARD	IMMATURE	1.70
	MALLARD	IMMATURE	0.55
	MALLARD	IMMATURE	1.90
	MALLARD	IMMATURE	1.04
	MALLARD	ADULT	0.98
	WOOD DUCK	ADULT	<0.25

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Based on these results, the entire Saugatuck carp data base for the years 1981, 1983, 1985 and 1986 and the Saugatuck bass data base for the years 1981 and 1985 was analyzed using the Kruskal-Wallis non-parametric test. This analysis again found that no significant ($p = 0.05$) difference between years at this location for either species.

This indicates that there was no change in PCB concentrations in fish at Saugatuck during the 1981-86 time period.

4.2.5 Waterfowl

Waterfowl have been sampled in the Area of Concern in 1985 and 1986 by the United States Fish and Wildlife Service. In 1985, eight immature mallards, one adult mallard and one adult wood duck were analyzed for PCB. The birds were plucked, eviscerated and feet removed prior to analyses. PCB concentrations ranged from 0.25 to 1.9 mg/kg (Table 8). Converting these values to a fat basis, PCB values ranged from 2.7 to 700 ppm. All of the immature ducks collected exceeded the FDA action level of 3 ppm PCB on a fat basis.

In 1986, mute swan eggs were collected as part of the effort to reintroduce the trumpeter swan. The eggs were from the Allegan State Game Area in the vicinity of the Kalamazoo River. Fourteen eggs were anlyzed for PCBs. Concentrations ranged from 0.1 to 1.6 mg/kg with a mean concentration of 0.4 mg/kg (Table 9). This mean concentration is greater than the FDA action level for eggs (0.3 mg/kg).

From: Kalamazoo River Remedial Action Plan
MDNR, 1987

Catalog No.:
Study I.D. No.: 89-3-002

TITLE: MICHIGAN WATERFOWL CONTAMINANTS SURVEY

Analyze all samples for the compounds specified under analyses requested.
Numbers in parenthesis refer to Michigan DNR Wildlife Region

Sample NO	Common name	Matrix	Sample Type	Sample Location	Sample Wt. (g)	Analyses Requested
WPL-1A	Mallard	Breast/skin	Individual	Kalamazoo River(8)	120.77	OCs, Hg
WPL-1B	Mallard	Breast	Individual	Kalamazoo River	98.95	OCs, Hg
WPL-4A	Mallard	Breast/skin	Individual	Potawatomie Marsh	111.75	OCs, Hg
WPL-4B	Mallard	Breast	Individual	Potawatomie Marsh	89.27	OCs, Hg
WPL-5A	Mallard	Breast	Individual	Potawatomie Marsh	66.45	OCs, Hg
WPL-5B	Mallard	Breast	Individual	Potawatomie Marsh	63.32	OCs, Hg
WPL-6A	Mallard	Breast/skin	Individual	Potawatomie Marsh	68.62	OCs, Hg
WPL-6B	Mallard	Breast	Individual	Potawatomie Marsh	75.29	OCs, Hg
WPL-7A	Mallard	Breast/skin	Individual	Potawatomie Marsh	66.32	OCs, Hg
WPL-8A	Mallard	Breast/skin	Individual	Potawatomie Marsh	90.92	OCs, Hg
WPL-8B	Mallard	Breast	Individual	Potawatomie Marsh	92.56	OCs, Hg
WPL-16A	Mallard	Breast/skin	Individual	Maple River(7)	83.31	OCs, Hg
WPL-16B	Mallard	Breast	Individual	Maple River	64.82	OCs, Hg
WPL-17A	Mallard	Breast/skin	Individual	Maple River	76.61	OCs, Hg
WPL-17B	Mallard	Breast	Individual	Maple River	72.01	OCs, Hg
WPL-23A	Mallard	Breast/skin	Individual	Shiawassee River	105.80	OCs, Hg
WPL-23B	Mallard	Breast	Individual	Shiawassee River	73.00	OCs, Hg
WPL-24A	Mallard	Breast/skin	Individual	Shiawassee River	78.93	OCs, Hg
WPL-24B	Mallard	Breast	Individual	Shiawassee River	70.82	OCs, Hg
WPL-25A	Mallard	Breast/skin	Individual	Shiawassee River	68.14	OCs, Hg
WPL-25B	Mallard	Breast	Individual	Shiawassee River	66.20	OCs, Hg
WPL-27A	Mallard	Breast/skin	Individual	Shiawassee River	91.48	OCs, Hg
[illegible]7A	Mallard	Breast/skin	Individual	Saginaw Bay (1) (Nayanquin Pt)	68.35	OCs, Hg
WPL-48A	Mallard	Breast/skin	Individual	Nayanquin Pt	47.79	OCs, Hg
WPL-49A	Mallard	Breast/skin	Individual	Nayanquin Pt	111.60	OCs, Hg
WPL-49B	Mallard	Breast	Individual	Nayanquin Pt	73.60	OCs, Hg
WPL-50A	Mallard	Breast/skin	Individual	Nayanquin Pt	91.43	OCs, Hg
WPL-50B	Mallard	Breast	Individual	Nayanquin Pt	72.45	OCs, Hg
WPL-56A	Mallard	Breast/skin	Individual	(Fish Pt.)	61.41	OCs, Hg
WPL-57A	Mallard	Breast/skin	Individual	(Wild Fowl Bay)	88.41	OCs, Hg
WPL-57B	Mallard	Breast	Individual	Wild Fowl Bay	93.25	OCs, Hg
WPL-58A	Mallard	Breast/skin	Individual	(Fish Pt.)	82.17	OCs, Hg
WPL-59A	Mallard	Breast/skin	Individual	Fish Pt.	66.40	OCs, Hg
WPL-59B	Mallard	Breast	Individual	Fish Pt.	63.07	OCs, Hg
WPL-60A	Mallard	Breast/skin	Individual	Fish Pt.	78.06	OCs, Hg
WPL-60B	Mallard	Breast	Individual	Fish Pt.	72.35	OCs, Hg
WPL-67A	Mallard	Breast	Individual	Reedsburg Flood(11)	70.88	OCs, Hg
WPL-69A	Mallard	Breast	Individual	Mud Lake	74.72	OCs, Hg
WPL-70A	Mallard	Breast	Individual	Houghton Lake	81.01	OCs, Hg
WPL-126A	Mallard	Breast/skin	Individual	Harsens Is. (3)	135.05	OCs, Hg
WPL-127A	Mallard	Breast/skin	Individual	Harsens Is.	108.18	OCs, Hg
WPL-128A	Mallard	Breast/skin	Individual	Harsens Is.	109.31	OCs, Hg
WPL-129A	Mallard	Breast/skin	Individual	Harsens Is.	98.31	OCs, Hg
WPL-130A	Mallard	Breast/skin	Individual	Harsens Is.	81.51	OCs, Hg
WPL-131A	Mallard	Breast/skin	Individual	Harsens Is.	118.47	OCs, Hg
[illegible]-132A	Mallard	Breast/skin	Individual	Harsens Is.	89.66	OCs, Hg
[illegible]132B	Mallard	Breast	Individual	Harsens Is.	100.06	OCs, Hg
[illegible]-133A	Mallard	Breast/skin	Individual	Harsens Is.	115.43	OCs, Hg
WPL-133B	Mallard	Breast	Individual	Harsens Is.	96.47	OCs, Hg
WPL-134A	Mallard	Breast/skin	Individual	Harsens Is.	82.87	OCs, Hg
WPL-134B	Mallard	Breast	Individual	Harsens Is.	92.51	OCs, Hg
WPL-135A	Mallard	Breast/skin	Individual	Harsens Is.	121.02	OCs, Hg
WPL-135B	Mallard	Breast	Individual	Harsens Is.	99.96	OCs, Hg

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NO 5851
CH NO. 89-3-002
ER NO. 85800-89-
08008

MISSISSIPPI STATE CHEMICAL LABORATORY
BOX CR
MISSISSIPPI STATE, MS 39762
REPORT FORM
USDI/FWS

ORGANOCHLORINES

DATE RECEIVED 01/12/90

PARTS PER MILLION AS RECEIVED (WET WT)

FWS #	WPL-1A	WPL-1B	WPL-4A	WPL-4B	WPL-5A	WPL-5B	WPL-6A
LAB #	784228	784229	784230	784231	784232	784233	784234
MATRIX	Mallard Bre./skin	Mallard Breast	Mallard Bre./skin	Mallard Breast	Mallard Breast	Mallard Breast	Mallard Bre./Skin
COMPOUND							
HCB	ND*	ND	ND	ND	ND	ND	ND
α-BHC	ND	ND	ND	ND	ND	ND	ND
γ-BHC	ND	ND	ND	ND	ND	ND	ND
β-BHC	ND	ND	ND	ND	ND	ND	ND
δ-BHC	ND	ND	ND	ND	ND	ND	ND
Oxychlordane	ND	ND	ND	ND	ND	ND	ND
Hept. Epox.	ND	ND	ND	ND	ND	ND	ND
γ-Chlordane	ND	ND	ND	ND	ND	ND	ND
t-Nonachlor	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ND	ND	ND	ND	ND	ND	ND
PCB's (total)	0.29	ND	ND	ND	ND	ND	ND
o, p'-DDE	ND	ND	ND	ND	ND	ND	ND
α-Chlordane	ND	ND	ND	ND	ND	ND	ND
p, p'-DDE	0.01	ND	0.07	0.01	ND	ND	0.01
Dieldrin	ND	ND	ND	ND	ND	ND	ND
o, p'-DDD	ND	ND	ND	ND	ND	ND	ND
Endrin	ND	ND	ND	ND	ND	ND	ND
cis-nonachlor	ND	ND	ND	ND	ND	ND	ND
o, p'-DDT	ND	ND	ND	ND	ND	ND	ND
p, p'-DDD	ND	ND	ND	ND	ND	ND	ND
p, p'-DDT	ND	ND	ND	ND	ND	ND	ND
Mirex	ND	ND	ND	ND	ND	ND	ND
OTHER:							
WEIGHT (g)	120	97.2	111	86.8	65.8	59.3	68.5
MOISTURE (%)	72.5	73.5	69.0	73.0	67.0	71.5	67.5
LIPID (%)	3.75	1.75	8.60	2.35	6.45	2.25	8.60

Lower Level of Detection - 0.01 ppm for Tissue, Soil, Etc 0.05 for Toxaphene and PCBs
For Water, LLD- 0.005 ppm for OCs, Tox , PCBs
**Spike - ppm for
* - Confirmed by GC/Mass Spectrometry
*ND - None Detected
***NS - Not Spiked

Signature

TYPE: Mallard
./skin

NO. 5851
CH NO. 89-3-002
ER NO. 85800-89-
08008

MISSISSIPPI STATE CHEMICAL LABORATORY
BOX CR
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USDI/FWS

ORGANOCHLORINES

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PARTS PER MILLION AS RECEIVED (WET WT)

FWS #	WPL-6B	WPL-7A	WPL-8A	WPL-8B	WPL-8B	WPL-16A	WPL-16B
LAB #	784235	784236	784237	784238A	784238B	784239	784240
MATRIX	Mallard Breast	Mallard Bre./skin	Mallard Bre./skin	Mallard Breast	Duplicate Ma.Breast	Mallard Bre./skin	Mallard Breast
COMPOUND							
HCB	ND*	ND	ND	ND	ND	ND	ND
α-BHC	ND	ND	ND	ND	ND	ND	ND
γ-BHC	ND	ND	ND	ND	ND	ND	ND
β-BHC	ND	ND	ND	ND	ND	ND	ND
δ-BHC	ND	ND	ND	ND	ND	ND	ND
Oxychlordane	ND	ND	ND	ND	ND	ND	ND
Hept. Epox.	ND	ND	ND	ND	ND	ND	ND
γ-Chlordane	ND	ND	ND	ND	ND	ND	ND
t-Nonachlor	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ND	ND	ND	ND	ND	ND	ND
PCB's (total)	ND	ND	ND	ND	ND	ND	ND
o, p'-DDE	ND	ND	ND	ND	ND	ND	ND
α-Chlordane	ND	ND	ND	ND	ND	ND	ND
p, p'-DDE	ND	ND	0.01	ND	ND	0.01	ND
Dieldrin	ND	ND	ND	ND	ND	ND	ND
o, p'-DDD	ND	ND	ND	ND	ND	ND	ND
Endrin	ND	ND	ND	ND	ND	ND	ND
cis-nonachlor	ND	ND	ND	ND	ND	ND	ND
o, p'-DDT	ND	ND	ND	ND	ND	ND	ND
p, p'-DDD	ND	ND	ND	ND	ND	ND	ND
p, p'-DDT	ND	ND	ND	ND	ND	ND	ND
Mirex	ND	ND	ND	ND	ND	ND	ND
OTHER:							
WEIGHT (g)	75.0	63.7	90.8	92.1	92.1	81.6	64.1
MOISTURE (%)	73.0	69.5	70.5	73.0	73.0	66.5	70.5
LIPID (%)	1.95	5.25	4.60	2.40	2.30	8.70	2.80

Lower Level of Detection - 0.01 ppm for Tissue, Soil, Etc. 0.05 for Toxaphene and PCBs.
For Water, LLD- 0.005 ppm for OCs, Tox , PCBs
**Spike - ppm for
* - Confirmed by GC/Mass Spectrometry
*ND - None Detected
***NS - Not Spiked

Larry Lane
Signature