70235

August 29, 2000

Adam Ayers
Project Scientist
General Electric Company
320 Great Oaks Office Park, Suite 323
Albany, NY 12203

Re: Hudson River PCBs Superfund Site

Dear Mr. Ayers:

Pusuant to your recent request, enclosed are data on PCB concentrations in Hudson River waterfowl, mink, and otter that the U.S. Environmental Protection Agency received from David Mayack of the New York State Department of Environmental Conservation.

If you have any questions or need additional information regarding this matter, please contact me at (212) 637-3959.

Sincerely yours,

- S -

Alison A. Hess, C.P.G.
Project Manager
Hudson River PCBs Site

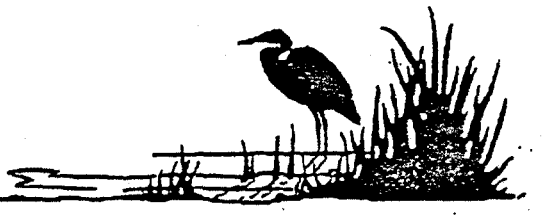
Enclosure

John P. Cahill
Commissioner

FAX

New York State Department of Environmental Conservation
Hale Creek Field Station
182 Steele Avenue Extension
Gloversville, New York 12078

Telephone Number: (518) 773-7318
Fax Number: (518) 773-7319



TAMS Consultants

To: Helen Chernoff
Mark Moese

Fax Number: 973-338-1052

From: D.T. Mayock

Number of Pages: 29
(Inclusive of Cover Sheet)

Date: 9/13/99

Subject: Data on Hudson River waterfowl, mink and otter

Comments:

1) Waterfowl - location: line #1 flyway
line #2 County, Town, site

2) Assessment for mink and otter - data from Foley 1988

3) Data from otter reintroduction program

Some of this information is fairly cryptic. Please call if you have questions.

DTM

Organochlorine Residues in New York [illegible]
Harvested by Hunters in 1983-1984

AKE CHAMPLAIN - HUDSON RIVER

[illegible]son Vt., Lake Champlain

pecies	SCAUP	BUFFLEHEAD
CB-fat	3.6	5.2
std. dev.	5.4	10.6
sample	3	7
minimum	0.5	0.2
maximum	9.8	29.0
CB-muscle	0.10	0.08
std. dev.	0.13	0.18
sample	4	5
minimum	L	L
maximum	0.3	0.4
DTr-fat	1.000	0.518
std. dev.	1.542	0.697
sample	3	7
minimum	0.07	0.02
maximum	2.78	2.00
DDTr-muscle	0.020	0.009
std. dev.	0.020	0.013
sample	4	5
minimum	L	L
maximum	0.04	0.03
[illegible]drin	52	24
[illegible]d. dev.	48	13
sample	3	7
chlordane	17	34
std. dev.	29	29
sample	3	7
HCB	28	21
std. dev.	23	16
sample	3	7

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321958

LAKE CHAMPLAIN - HUDSON RIVER

Bays Bay

species	WOOD DUCK
PCB-fat	0.3
std. dev.	N
sample	1
minimum	0.3
maximum	0.3
PCB-muscle	0.00
std. dev.	N
sample	1
minimum	L
maximum	L
DDTr-fat	0.170
std. dev.	N
sample	1
minimum	0.17
maximum	0.17
DDTr-muscle	0.003
std. dev.	N
sample	1
minimum	L
maximum	L
ldrin	10
d. dev.	N
sample	1
chlordane	L
std. dev.	N
sample	1
HCB	L
std. dev.	N
sample	1

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

LAKE CHAMPLAIN - HUDSON RIVER

[illegible]ton, Lake Champlain

species	MALLARD	BLACK DUCK	BUFFLEHEAD
PCB-fat	0.1	0.4	0.4
std. dev.	N	N	0.5
sample	1	1	6
minimum	L	0.4	L
maximum	L	0.4	1.4
PCB-muscle	0.00	0.00	0.00
std. dev.	N	N	0.00
sample	1	1	5
minimum	L	L	L
maximum	L	L	L
DDTr-fat	0.150	0.110	0.107
std. dev.	N	N	0.115
sample	1	1	6
minimum	0.15	0.11	L
maximum	0.15	0.11	0.35
DDTr-muscle	0.003	0.003	0.003
std. dev.	N	N	0.002
sample	1	1	5
minimum	L	L	L
maximum	L	L	0.01
d[illegible]drin	L	100	7
[illegible]. dev.	N	N	4
sample	1	1	6
chlordane	L	370	15
std. dev.	N	N	5
sample	1	1	6
HCB	L	L	23
std. dev.	N	N	12
sample	1	1	6

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

LAKE CHAMPLAIN - HUDSON RIVER

Columbia, Germantown, Cheviot

Species	SCAUP	MALLARD	BLACK DUCK
PCB-fat	5.1	22.7	6.0
std. dev.	5.9	N	N
sample	2	1	1
minimum	0.9	22.7	6.0
maximum	9.3	22.7	6.0
PCB-muscle	0.14	0.23	0.18
std. dev.	0.20	N	N
sample	2	1	1
minimum	L	0.2	0.2
maximum	0.3	0.2	0.2
DDTr-fat	0.830	1.790	0.830
std. dev.	0.537	N	N
sample	2	1	1
minimum	0.45	1.79	0.83
maximum	1.21	1.79	0.83
DDTr-muscle	0.025	0.003	0.020
std. dev.	0.021	N	N
sample	2	1	1
minimum	0.01	L	0.02
maximum	0.04	L	0.02
ldrin	365	70	40
std. dev.	389	N	N
sample	2	1	1
chlordane	L	30	L
std. dev.	0	N	N
sample	2	1	1
HCB	35	40	10
std. dev.	21	N	N
sample	2	1	1

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321961

Organochlorine Residues in New York Waterfowl
Harvested by Hunters in 1983-1984

LAKE CHAMPLAIN - HUDSON RIVER

Columbia, Greenport, Rogers Island WMA

species	MALLARD	BLACK DUCK
PCB-fat	2.7	11.9
std. dev.	0.9	16.4
sample	2	6
minimum	2.0	2.0
maximum	3.3	43.0
PCB-muscle	0.00	0.10
std. dev.	0.00	0.19
sample	2	7
minimum	L	L
maximum	L	0.5
DDTr-fat	0.790	0.577
std. dev.	0.170	0.465
sample	2	6
minimum	0.67	0.14
maximum	0.91	1.30
DDTr-muscle	0.004	0.004
std. dev.	0.002	0.004
sample	2	7
minimum	L	L
maximum	0.01	0.01
ldrin	30	32
d. dev.	0	19
sample	2	6
chlordane	35	27
std. dev.	21	16
sample	2	6
HCB	13	16
std. dev.	11	15
sample	2	6

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

LAKE CHAMPLAIN - HUDSON RIVER

Dutchess, Clinton, Salt Point

species	CAN. GOOSE
PCB-fat	0.2
std. dev.	0.3
sample	3
minimum	L
maximum	0.6
PCB-muscle	0.00
std. dev.	0.00
sample	3
minimum	L
maximum	L
DDTr-fat	0.383
std. dev.	0.080
sample	3
minimum	0.30
maximum	0.46
DDTr-muscle	0.004
std. dev.	0.002
sample	3
minimum	L
maximum	0.01
ldrin	L
std. dev.	0
sample	3
chlordane	10
std. dev.	17
sample	3
HCB	L
std. dev.	0
sample	3

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321963

Organochlorine Residues in New York Waterfowl
Harvested by Hunters in 1983-1984

AKE CHAMPLAIN - HUDSON RIVER

u..iess, Red Hook, N. and S. Bays

pecies	MALLARD	WOOD DUCK	CAN. GOOSE
CB-fat	13.0	0.5	0.1
std. dev.	N	0.4	0.1
sample	1	2	7
minimum	13.0	0.3	L
maximum	13.0	0.8	0.2
CB-muscle	0.15	0.00	0.00
std. dev.	N	0.00	0.00
sample	1	2	7
minimum	0.1	L	L
maximum	0.1	L	L
DDTr-fat	1.020	1.180	0.105
std. dev.	N	0.396	0.114
sample	1	2	7
minimum	1.02	0.90	L
maximum	1.02	1.46	0.26
DDTr-muscle	0.003	0.012	0.003
std. dev.	N	0.002	0.000
sample	1	2	7
minimum	L	0.01	L
maximum	L	0.01	L
d..irin	80	L	L
s..d. dev.	N	0	0
sample	1	2	7
chlordane	30	L	L
std. dev.	N	0	0
sample	1	2	7
HCB	20	L	L
std. dev.	N	0	0
sample	1	2	7

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321964

CHAMPLAIN - HUDSON RIVER

ıtchess, Washington, Thorn Farm Rt 44

pecies	CAN. GOOSE
CB-fat	0.1
std. dev.	0.1
sample	2
minimum	L
maximum	0.2
'CB-muscle	0.00
std. dev.	0.00
sample	2
minimum	L
maximum	L
)DTr-fat	0.040
std. dev.	0.014
sample	2
minimum	0.03
maximum	0.05
DDTr-muscle	0.003
std. dev.	0.000
sample	2
minimum	L
ximum	L
dieldrin	20
std. dev.	0
sample	2
chlordane	L
std. dev.	0
sample	2
HCB	L
std. dev.	0
sample	2

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321965

HAMPLAIN - HUDSON RIVER

ex, Ticonderoga, Fivemile Creek

cies	WOOD DUCK
3-fat	0.6
td. dev.	N
ample	1
inimum	0.6
aximum	0.6
B-muscle	0.00
td. dev.	N
ample	1
inimum	L
aximum	L
Tr-fat	0.610
td. dev.	N
ample	1
inimum	0.61
aximum	0.61
)Tr-muscle	0.015
std. dev.	N
sample	1
ninimum	0.02
maximum	0.02
ieldrin	L
std. dev.	N
sample	1
hlordane	L
std. dev.	N
sample	1
CB	L
std. dev.	N
sample	1

rithmetic mean, one standard deviation, sample size.
CB residues (ppm, wet weight), limit of detection = 0.01 ppm.
)DTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
)ieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
:hlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues
(ppb, wet weight, fat tissue), limit of detection = 10 ppb.
ICB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
/alues for muscle tissue not adjusted for lipid content.
= below level of detection.
N = not applicable.
)ata for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321966

LAKE CHAMPLAIN - HUDSON RIVER

Orange, Tuxedo, Sterling Forest

Species	CAN. GOOSE
PCB-fat	0.5
std. dev.	N
sample	1
minimum	0.5
maximum	0.5
PCB-muscle	0.00
std. dev.	N
sample	1
minimum	L
maximum	L
DDTr-fat	0.600
std. dev.	N
sample	1
minimum	0.60
maximum	0.60
DDTr-muscle	0.020
std. dev.	N
sample	1
minimum	0.02
maximum	0.02
dieldrin	80
std. dev.	N
sample	1
chlordane	L
std. dev.	N
sample	1
HCB	20
std. dev.	N
sample	1

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321967

Organochlorine Residues in New York ...
Harvested by Hunters in 1983-1984

KB-CHAMPLAIN - HUDSON RIVER

cKland, Stony Point, Stony Point Park

ecies	MALLARD
:B-fat	10.8
:td. dev.	11.6
:ample	2
inimum	2.5
aximum	19.0
:B-muscle	0.14
:td. dev.	0.21
:ample	2
inimum	L
aximum	0.3
DTr-fat	7.710
std. dev.	6.039
sample	2
minimum	3.44
maximum	11.98
DTr-muscle	0.115
std. dev.	0.106
sample	2
minimum	0.04
maximum	0.19
l: drin	60
std. dev.	14
sample	2
chlordane	45
std. dev.	21
sample	2
HCB	20
std. dev.	0
sample	2

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321968

LAKE CHAMPLAIN - HUDSON RIVER

Saratoga, Lake Lonely

species	WOOD DUCK
PCB-fat	0.7
std. dev.	N
sample	1
minimum	0.7
maximum	0.7
PCB-muscle	0.00
std. dev.	N
sample	1
minimum	L
maximum	L
DDTr-fat	0.220
std. dev.	N
sample	1
minimum	0.22
maximum	0.22
DDTr-muscle	0.003
std. dev.	N
sample	1
minimum	L
maximum	L
dieldrin	L
std. dev.	N
sample	1
chlordane	10
std. dev.	N
sample	1
HCB	L
std. dev.	N
sample	1

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

Organochlorine Residues in New York Waterfowl
Harvested by Hunters in 1983-1984

K[illegible]HAMPLAIN - HUDSON RIVER

ratoga, Northumberland, Griffin Is.

ecies	WOOD DUCK
B-fat	3.5
td. dev.	N
ample	1
inimum	3.5
aximum	3.5
B-muscle	0.10
td. dev.	N
ample	1
inimum	0.1
aximum	0.1
DTr-fat	3.900
std. dev.	N
sample	1
minimum	3.90
maximum	3.90
DTr-muscle	0.010
std. dev.	N
sample	1
minimum	0.01
maximum	0.01
i[illegible]rin	10
std. dev.	N
sample	1
hlordane	20
std. dev.	N
sample	1
CB	L
std. dev.	N
sample	1

rithmetic mean, one standard deviation, sample size.
CB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
ieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
hlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
CB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
alues for muscle tissue not adjusted for lipid content.
= below level of detection.
= not applicable.
ata for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321970

LAKE CHAMPLAIN - HUDSON RIVER

Saratoga, Saratoga Lake

species	WOOD DUCK	BLACK DUCK
PCB-fat	0.7	0.4
std. dev.	0.5	N
sample	2	1
minimum	0.3	0.4
maximum	1.0	0.4
PCB-muscle	0.00	0.00
std. dev.	0.00	N
sample	2	1
minimum	L	L
maximum	L	L
DDTr-fat	0.075	0.890
std. dev.	0.021	N
sample	2	1
minimum	0.06	0.89
maximum	0.09	0.89
DDTr-muscle	0.003	0.003
std. dev.	0.000	N
sample	2	1
minimum	L	L
maximum	L	L
ldrin	L	20
std. dev.	0	N
sample	2	1
chlordane	50	L
std. dev.	71	N
sample	2	1
HCB	L	20
std. dev.	0	N
sample	2	1

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

CHAMPLAIN - HUDSON RIVER

Washington

Species	WOOD DUCK
PCB-fat	0.2
std. dev.	N
sample	1
minimum	0.2
maximum	0.2
PCB-muscle	0.00
std. dev.	N
sample	1
minimum	L
maximum	L
DDTr-fat	0.050
std. dev.	N
sample	1
minimum	0.05
maximum	0.05
DDTr-muscle	0.003
std. dev.	N
sample	1
minimum	L
maximum	L
dieldrin	L
std. dev.	N
sample	1
chlordane	L
std. dev.	N
sample	1
HCB	L
std. dev.	N
sample	1

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321972

LAKE CHAMPLAIN - HUDSON RIVER

hington, Big Marsh

species	WOOD DUCK
PCB-fat	0.2
std. dev.	0.1
sample	2
minimum	0.1
maximum	0.2
PCB-muscle	0.00
std. dev.	0.00
sample	2
minimum	L
maximum	L
DDTr-fat	0.122
std. dev.	0.067
sample	2
minimum	0.08
maximum	0.17
DDTr-muscle	0.003
std. dev.	0.000
sample	2
minimum	L
maximum	L
ldrin	L
d. dev.	0
sample	2
chlordane	L
std. dev.	0
sample	2
HCB	L
std. dev.	0
sample	2

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321973

LAKE CHAMPLAIN - HUDSON RIVER

hington, Putnam, Mill Bay

species	WOOD DUCK
PCB-fat	0.1
std. dev.	N
sample	1
minimum	0.1
maximum	0.1
PCB-muscle	0.00
std. dev.	N
sample	1
minimum	L
maximum	L
DDTr-fat	0.062
std. dev.	N
sample	1
minimum	0.06
maximum	0.06
DDTr-muscle	0.003
std. dev.	N
sample	1
minimum	L
maximum	L
eldrin	L
d. dev.	N
ample	1
chlordane	L
std. dev.	N
sample	1
HCB	L
std. dev.	N
sample	1

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

LAKE CHAMPLAIN - HUDSON RIVER

W[illegible]ington, Putnam, Nigger Marsh

species	BLACK DUCK
PCB-fat	0.1
std. dev.	N
sample	1
minimum	L
maximum	L
PCB-muscle	0.00
std. dev.	N
sample	1
minimum	L
maximum	L
DDTr-fat	0.080
std. dev.	N
sample	1
minimum	0.08
maximum	0.08
DDTr-muscle	0.003
std. dev.	N
sample	1
minimum	L
maximum	L
[illegible]drin	L
[illegible]d. dev.	N
sample	1
chlordane	L
std. dev.	N
sample	1
HCB	L
std. dev.	N
sample	1

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

LAKE CHAMPLAIN - HUDSON RIVER

Washington, Whitehall, Ward Marsh

species	WOOD DUCK
PCB-fat	0.2
std. dev.	0.2
sample	3
minimum	L
maximum	0.4
PCB-muscle	0.00
std. dev.	0.00
sample	3
minimum	L
maximum	L
DDTr-fat	0.153
std. dev.	0.206
sample	3
minimum	0.02
maximum	0.39
DDTr-muscle	0.003
std. dev.	0.000
sample	3
minimum	L
maximum	L
ldrin	L
std. dev.	0
sample	3
chlordane	L
std. dev.	0
sample	3
HCB	L
std. dev.	0
sample	3

Arithmetic mean, one standard deviation, sample size.
PCB residues (ppm, wet weight), limit of detection = 0.01 ppm.
DDTR (DDT+DDE+DDD) residues (ppm, wet weight), limit of detection = 0.005 ppm.
Dieldrin residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Chlordane (chlordane+trans-nonachlor+heptachlor epoxide+oxychlordane) residues (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
HCB (ppb, wet weight, fat tissue), limit of detection = 10 ppb.
Values for muscle tissue not adjusted for lipid content.
L = below level of detection.
N = not applicable.
Data for regions in Environmental and Monitoring Assessment 21: 37-48, 1992.

321976

SEP 13 '99 11:11 518 773 7319 PAGE.20

Current Status of the Evaluation of the Impact of Contaminants on Mammals in the Hudson River Drainage, April 21, 1999

A state-wide survey of PCB and mercury levels in mink and otter (Foley et al 1988) provide the only available published data for contaminant concentrations of mink and otter from the Hudson River. These data are limited to an analysis of 18 mink and 2 river otter from the Hudson River drainage. Foley et al (1988) also evaluated contaminant levels in fish; assessment of contaminant levels was based on data obtained from a variety of fish species collected from lower and upper Hudson River basins. Leonards et al (1994) summarized toxicity studies of mink and developed a model of PCB toxicity to mink relative to reproductive success. Critical levels of PCBs in mink and in their diet that affect the number of kits produced and affect kit survival were developed from modeling efforts. Although Smit et al (1996) examined a variety of potential toxicological responses of European otter to PCBs, proposed critical levels of PCBs in otter, fish, and sediments were based on toxicological evaluation of effects of PCBs on hepatic vitamin A reduction in European otter. The data for PCB levels in mink, river otter, and fish from the Hudson River were evaluated using the toxicological criteria of Leonards et al (1994) and Smit et al (1996). This evaluation provides a preliminary indication of the potential toxicological effects of PCBs on reproduction and health of mink and river otter and suggests the relative roles of fish as a dietary source of PCB contamination for each of these species in the Hudson River.

Foley et al (1988) reported PCB levels in adipose tissue of mink as PCB ug/g lipid (Table 1). Assuming PCB ug/g lipid levels are similar for different tissues within the same animal and, consequently, PCB ug/g lipid levels for different tissues are comparable, mean levels of PCB ug/g lipid in Hudson River mink are below the EC1 (no-effect) critical levels for litter size and kit survival (Table 2). Moreover, if mink can be assumed to have the same toxicological relationship as European otter relative to PCB burden and reduction in hepatic vitamin A, PCB ug/g lipid in mink from the Hudson River are at the EC1 (no-effect) level (Table 3). In contrast, mean PCB ug/g lipid levels for river otter from the Hudson River are approximately 6 times greater than levels in mink from the drainage (Table 4). Assuming river otter have the same reproductive sensitivity to PCBs as mink, a comparison of mean PCB ug/g lipid in river otter to critical levels for reproduction in mink suggest that PCB may affect litter size and possibly kit survival of river otter in the Hudson River (Table 2). PCB ug/g lipid in river otter from the Hudson River exceed EC50 critical levels by a factor of approximately 2 for reduction in levels of hepatic vitamin A in European otter (Table 3). This preliminary comparison of PCB burdens to critical levels suggest that mink, in general, are accumulating PCBs to a lesser extent than river otter in the Hudson River and levels in mink are at or below "no-effect" levels in contrast to levels in river otter that exceed reproductive and health criteria for significant effects. Further investigation is needed to determine what proportion of the mink population is exposed to significant levels of PCBs and the consequent population and health effects and to assess the impact of apparent significant exposures of river otter to PCBs on population status and individual health.

A comparison of levels of PCB ug/g wet weight in fish from the Hudson (Table 5) to critical dietary levels for mink (Table 6) suggests that concentrations exceed EC50 critical dietary levels for kit production and survival by factors of 3 and 2, respectively. If fish comprise a major portion of the diet of Hudson River mink, relationships between dietary level and associated levels in mink suggest that levels in mink should be considerably higher than the levels reported by Foley et al 1988. One possible explanation for the lower than expected PCB burdens in Hudson River mink based on levels in fish is that much of their diet may consist of relatively uncontaminated prey (*I. e.* terrestrial animals). Given the opportunistic nature of mink and their highly varied prey base, a diet predominately terrestrial in origin is quite possible. However, the variability in diet and opportunistic nature of mink foraging suggests that a portion of the population may be, nevertheless, exposed to high dietary levels of PCBs if ecological conditions favor the availability of aquatic prey to mink. Levels of PCBs in river otter may reflect a diet more highly contaminated with PCBs than that of mink. The diet of the river otter is comparatively more specialized than mink with fish comprising most of the diet; consequently, the PCB levels in river otter from the Hudson River drainage may reflect this dietary specialization. Although PCB levels in river otter are high, the relationship between dietary levels and contaminant burdens in otters suggest that levels in river otter from the Hudson River drainage are not as high as expected given the level of PCBs in Hudson River fish. Lower than expected levels suggest that dietary exposure to PCBs is more complex than indicated by a presumed diet based on a general evaluation of levels of PCBs in fish from the Hudson River. Otter may be selective in fish species or include other organisms in their diet or forage in less contaminated habitat thereby lowering their exposure to PCBs. The evaluation of levels of PCBs in Hudson River fish relative to levels in mink and otter suggest that for both species a complex dietary composition warranting further investigation is needed to fully understand exposure of these species to PCBs and consequent toxicological effects.

A number of caveats exist in this preliminary evaluation. Comparisons are made among different mustelid species. Critical levels for PCB-vitamin A relationships are based on evaluation of European otter (*Lutra lutra*) which is a separate species from the river otter (*Lutra canadensis*) and mink (*Mustela vison)* of North America. There are physiological differences between otter species as well as more pronounced differences between otter species and mink which may warrant caution in using criteria developed for European otter to evaluate North American mink and river otter. Similarly, reproductive differences exist between these species that suggests that criteria developed to evaluate reproduction in mink relative to PCB contamination may not be fully adequate to evaluate reproduction in otter species. Furthermore, mustelid species apparently vary considerably in their sensitivity to PCBs; the ferret (*Mustela putorius furo*) is considerably more tolerant than the mink to PCB contamination. The evaluation of toxicity based on total PCB levels lacks toxicological precision. Given that relative toxicity of specific PCB congeners varies from a factor of 1 to 10,000 and congener composition is affected by ecological factors, an increase in precision regarding the potential toxicological effects of PCBs is required to adequately assess the impact of PCBs on mink and otter reproduction and health. Simple assumptions regarding dietary composition of these species have proved inadequate in assessing exposure; additional information on dietary composition and ecological factors regulating diet of these species is necessary to adequately assess the impact on populations.

Table 1. Total PCB residues in tissues of wild mink trapped in New York between 1982 and 1984 (Foley et al 1988).

Location	Adipose Tissue				Liver Tissue	
	ug/g, wet weight		ug/g, lipid		ug/g, wet weight	
	geo. mean	sample	geo. mean	95% C.I.	geo. mean	sample
S. Hudson	3.5	12	8.3	4.8-14.3	0.4	11
N. Hudson	4.4	6	9.5	4.4-20.4	0.6	7

Table 2. Proposed critical (EC_{90}) and safe levels (EC1) of total PCB in mink which were calculated with a one-compartment bioaccumulation model in combination with a dose-effect model (Leonards et al 1994).

	Mink Tissue (ug/g, wet weight)		Mink Tissue (ug/g, lipid) based on 2-3 % lipid	
	Litter Size	Kit Survival	Litter Size	Kit Survival
Critical level (EC_{90})	1.2	2.36	40-60	79-118
No-effect level (EC1)	0.47	1.29	16-24	43-65

Table 3. Proposed quality objectives (EC1, EC_{90}) for European otter and dietary fish, based on hepatic vitamin A reduction in European otter, and estimated corresponding PCB (total PCB) concentrations (Smit et al 1996).

	EC1	EC_{90}	Units
European otter	9	21	ug/g, lipid
Fish (total diet)	0.011	0.029	ug/g, wet weight
Fish (total diet)	0.177	0.465	ug/g, lipid

Table 4. Total PCB residues in adipose tissue of wild otter trapped in New York between 1982 and 1984 (Foley et al 1988).

Location	Adipose Tissue			
	ug/g, wet weight		ug/g, lipid	
	geo. mean	95% C.I.	geo. mean	95% C.I.
Hudson Valley	19.9	12.5-31.7	56.3	34.0-93.2

Table 5. Total PCB residues (ug/g, lipid) in fish (12 species) from Hudson River watershed and calculated total PCB, wet weight based on estimated 6 % lipid (Foley et al 1988).

Location	Fish Tissue (ug/g, lipid)			Fish Tissue (ug/g, wet weight)
	geo. mean	95% C.I.	sample	based on 6% lipid, geo. mean
Upper Hudson	25.1	17-38	87	1.5
Lower Hudson	26.5	19-37	46	1.6

Table 6. Proposed critical (EC50) and safe levels (EC1) of total PCB for mink diet which were calculated with a one-compartment bioaccumulation model in combination with a dose-effect model (Leonards et al 1994).

	Mink Diet PCB (ug/g, wet weight)	
	Litter Size	Kit Survival
Critical level (EC50)	0.371	0.730
No-effect level (EC1)	0.145	0.399

321980

June, 1991

Results of Sample Analysis of Otter Tissues from Otter Reintroduction Program

Liver samples were collected from 3 captured wild otter that were maintained on lake trout diets and subsequently killed and recovered after release at sites in western New York State. Plasma samples were collected from 4 captured wild otter after maintenance on a lake trout diet from 7 to 20 days. Plasma samples were also collected from 3 otter housed at the Seneca Park Zoo (diet unknown at this time). Samples were analyzed for organochlorine contaminant concentrations by the Analytical Services Unit at the NYS DEC Hale Creek Field Station (Table 1).

For liver samples, lipid-adjusted PCB levels in liver (Aroclors 1016/1248 and Aroclors 1254/1260) were determined directly from lipid and Aroclor concentrations for liver samples (Table 2). For otter from which plasma was sampled, lipid-adjusted liver Aroclor concentrations were calculated from lipid-adjusted Aroclor concentrations in plasma; a log-log linear relationship between lipid-adjusted PCB concentrations in liver and plasma in European otter was used to calculate liver concentrations (Table 2). The relationship between PCB levels in liver and plasma is based on PCB concentrations measured in terms of toxicity equivalency quotients. Consequently, calculations predicting Aroclor concentrations in liver from those in plasma assume that congener composition is similar in liver and plasma within each animal.

Levels of Aroclors 1016/1248 were below detectable levels for all samples and, consequently, were not considered further in the analysis of PCB contaminant burdens. For Aroclors 1254/1260, levels directly measured in liver or predicted in liver from plasma levels ranged from below detection to 124 μg/g of lipid. PCB levels (Aroclor 1254/1260) of animals with post-release periods of 11 to 240 days exceeded the EC_1 of 9 μg/g of lipid but only the otter with the shortest post-release period exceeded the EC_{90} of 21 μg/g of lipid based on hepatic reduction of retinol. For otter sampled while on maintenance diets, 3 of 4 otter exceeded the EC_1 of 9 μg/g of lipid; 2 of 4 otter exceeded the EC_{90} of 21 μg/g of lipid; and 1 of 4 otter exceed the criteria of 50 μg/g of lipid for reproductive impairment based on mink studies extrapolated to otter. None of PCB levels in otter from the Seneca Park Zoo exceeded the EC_1 of 9 μg/g of lipid.

PCB levels increased inversely with post-release periods to some degree. The otter with the 11-day post-release period exhibited a high PCB level as compared to levels in otter with post-release periods of 50 and 240 days. Levels in otters with long post-release periods were only marginally greater than EC_1 levels of 9 μg/g of lipid and levels in otter from the Seneca Park Zoo. Although confidence in the relationship is limited by sample number, this relationship, nevertheless, suggests that PCB levels in otter decrease after release.

For the 4 otter from which plasma was sampled immediately after the period that they were fed maintenance diet of lake trout, no relationship exists between the dietary period and PCB level in liver tissue (as predicted from plasma levels). The otter maintained the longest (20 days) on lake trout had the lowest PCB level for liver. Of the 3 otter maintained on lake trout for 7 days, PCB levels for liver ranged from just above the EC_1 level of 9 μg/g of lipid to 124 μg/g of lipid.

Lipid adjusted PCB levels in liver tissue calculated for otter at the end of period on the maintenance diet (Table 2) do not compare well with predicted levels for otter maintained on diets from specific sources (Table 3). For similar maintenance periods, comparisons demonstrate that PCB levels (Aroclors 1254/1260) for all but 2 of the 7 otter fall either above or below the range of predicted levels for the array of potential sources.

Although for these data no relationship exists between the maintenance diet and PCB accumulation in otter, the possibility that the maintenance diet is contributing the PCB burden of reintroduced otter cannot be ruled out due to the high degree of uncertainty in the analysis. No direct measure of PCBs in the actual diets fed individual otter is available and mean levels of PCBs in fish derived from past monitoring efforts may not be representative of PCB levels in the actual maintenance diet; consequently, the lack of an accurate measure of contaminant levels in the diet results in considerable uncertainty in the predicted PCB levels for otter on the maintenance diet. PCBs accumulated from environmental sources prior to capture will add to PCB burdens in otter; however, the contribution of other sources to PCB burdens in otter were not measured resulting in uncertainty in the assessment of PCB accumulation from the maintenance diet. Although a strong relationship between concentrations of PCBs in liver and plasma exist for otter with long-term exposure to PCBs from environmental sources, relationships between PCB concentrations in liver and plasma for accumulations from short-term exposure may not be as strong. These caveats in addition to the small sample size for this analysis limit confidence in the conclusion that PCB burdens in otter are not related to PCB contamination in the maintenance diet. Nevertheless, the results suggest that some otter in the reintroduction program have PCB burdens that may impair health and reproduction.

321983

able 1. Percent moisture, percent lipid, organochlorine contaminant burdens (µg/g, wet weight [liver], µg/ml [plasma]) for samples of otter tissue, otter reintroduction rogram.

SAMPLE	TISSUE	% MOIST	% LIPID	AR1016/ 1248	AR1254/ 1260	DDE	DDD	DDT	MIREX	PHOTO MIREX	HCB	OXYCHL	TRANSCHL	CISCHL	TRANSNON	DIELDRIN	ENDRIN
Dekalb 7 96	Liver	75.5	1.77	-0.020	0.570	0.061	-0.002	0.011	-0.002	-0.005	0.002	-0.010	-0.005	-0.005	0.017	0.010	-0.005
Dekalb 2 96	Liver	69.8	7.88	-0.020	0.827	0.186	0.004	0.006	0.002	-0.005	0.002	-0.010	-0.005	-0.005	0.032	0.020	-0.005
Dekalb 1 97	Liver	73.2	1.35	-0.020	0.205	0.002	-0.002	-0.002	-0.002	-0.005	-0.002	-0.010	-0.005	-0.005	-0.005	-0.005	-0.005
Shamberger 4 98	Plasma		0.39	-0.010	0.063	0.004	-0.002	-0.002	-0.002	-0.005	-0.002	-0.010	-0.005	-0.005	-0.005	-0.999	-0.999
Vershneider 5 98	Plasma		0.44	-0.010	0.017	-0.002	-0.002	-0.002	-0.002	-0.005	-0.002	-0.010	-0.005	-0.005	-0.005	-0.999	-0.999
Stone 1 98	Plasma		0.37	-0.010	0.023	-0.002	-0.002	0.009	-0.002	-0.005	-0.002	-0.010	-0.005	-0.005	-0.005	-0.999	-0.999
Stone 2 98	Plasma		0.36	-0.010	0.218	0.003	-0.002	-0.002	-0.002	-0.005	-0.002	-0.010	-0.005	-0.005	-0.005	-0.999	-0.999
Webb 1 99	Plasma		0.78	-0.010	-0.010	-0.002	-0.002	-0.002	-0.002	-0.005	-0.002	-0.010	-0.005	-0.005	-0.005	-0.999	-0.999
Webb 2 99	Plasma		0.44	-0.010	0.019	-0.002	-0.002	-0.002	-0.002	-0.005	-0.002	-0.010	-0.005	-0.005	-0.005	-0.999	-0.999
Webb 3 99	Plasma		0.41	-0.010	0.020	-0.002	-0.002	-0.002	-0.002	-0.005	-0.002	-0.010	-0.005	-0.005	-0.005	-0.999	-0.999

egative numbers indicate quantiation limits (except -9s mean not analyzed)
ata stored under s:otter99.dbf
lethod Oc1.105; concentrations are reported to no more than 3 significant figures
lasma sampes are reported as µg/ml
ver samples are reported as µg/g
› Lipid = percent lipid on a weight/volume basis for plasma and a weight/weight basis for liver
› Moisture = percent moisture on a weght/weight basis
›xychl = Oxychlordane
ranschl = Trans Chlordane
ischl = Cis Chlordane
ransnon = Trans Nonochlor
R = Arochlor

321984

SEP-13-1999 10:16 FROM FALE CREEK FIELD SIM. TO

le 2. Lipid-adjusted concentrations (μg/g of lipid) of PCB's (Arochlors) in otter tissue, post-release period, period on diet, and locations of recovery and capture, otter troduction program.

Sample	Tissue	Post-release period (days)	Period on lake trout diet (days)	AR1016/ 1248	AR1254/ 1260	Calculated [1] AR1254/1260 in liver from plasma at end of period on diet	Calculated [2] AR1254/1260 in liver at end of period on diet	Location of recovery	Location of capture
Dekalb 7 96	Liver	11	10	< 1.13	32.0	-	34.5	unknown	Washington Co. Town of Granville
Dekalb 2 96	Liver	50	30	< 0.254	10.5	-	14.9	Cattaragus Co. Town of Napoli	Washinton Co.
Dekalb 1 97	Liver	240	14	< 1.48	15.2	-	81.7	Cortland Co. Town of Virgil	Washington Co. Town of Fort Ann
Shamberger 4 98	Plasma	-	7	< 2.56	16.1	28.0	-	-	Delaware Co. Townof Hancock
Vershneider 5 98	Plasma	-	20	< 2.50	3.86	5.61	-	-	Herkimer Co. Town of Ohio
Stone 1 98	Plasma	-	7	< 2.70	6.22	9.59	-	-	Warren Co. Town of Lake Luzurne
Stone 2 98	Plasma	-	7	< 2.78	60.6	124	-	-	Warren Co. Town of Lake Luzurne
Webb 1 99	Plasma	-	-	< 1.28	< 1.28	< 1.63	-	Seneca Park Zoo	
Webb 2 99	Plasma	-	-	< 2.27	4.32	6.35	-	Seneca Park Zoo	
Webb 3 99	Plasma	-	-	< 2.44	4.88	7.29	-	Seneca Park Zoo	

er concentrations for animals from which only plasma was sampled were calculated:
(y) = 0.89log (x)-0.08 (r square = 0.92) where x = liver concentration and y = plasma concentration, from Dutch Working Group for Restoration of European Otter.

er concentrations for animals recovered after significant post-release period were calculated:
d adjusted PCB in liver at recovery/e^{-KT}, where instantaneous rate (K) = 0.007 day^{-1} (half life = 98 days for PCBs in otter, Dutch Working Group for Restoration of European Otter), T = post-release time days, and assuming no exposure to PCBs during post-release period.

321985

able 3. Predicted concentrations of PCB's (µg/g of lipid, Aroclors1254/1260) in otter tissue due to accumulation of PCB's from specific dietary sources, ter reintroduction program.

Lake	Year	Species	Weight range	Mean AR1254/1260 µg/g, wet weight	Feeding period (days)					
					7	10	14	20	21	30
Seneca	1991	Lake trout	> 1500 g	0.624	14.5	20.5	28.3	39.6	41.4	57.4
Erie	1994	Rainbow trout	> 2000 g	0.455	10.6	14.9	20.7	28.9	30.2	41.9
Ontario	1996	Lake trout	> 2000 g	1.46	33.9	47.9	66.1	92.6	96.9	134
Ontario	1996	Chinook salmon	< 9000 g	0.901	20.9	29.6	40.8	57.7	59.8	82.9
Ontario	1996	Coho salmon	all fish	0.616	14.3	20.2	27.9	39.1	40.9	56.7